Assignment

Properties of Integration, fundamental Integration formulae

Basic Level

1. $\int \sec x\,dx =$ **[MP PET 1988,95; Rajasthan PET 1996]**

(a) $\log\tan\left(\frac{\pi}{4}-\frac{x}{2}\right)+c$ (b) $\log(\sec x-\tan x)+c$ (c) $\log\left(\frac{\pi}{4}+x\right)+c$ (d) $\log(\sec x+\tan c)+c$

2. $\int 5\sin x\,dx =$ **[MP PET 1988]**

(a) $5\cos x+c$ (b) $-5\cos x+c$ (c) $5\sin x+c$ (d) $-5\sin x+c$

3. $\int(\sec x+\tan x)^2\,dx =$ **[MP PET 1987, 92]**

(a) $2(\sec x+\tan x)-x+c$ (b) $\frac{1}{3}(\sec x+\tan x)^3+c$ (c) $\sec x(\sec x+\tan x)+c$ (d) $2(\sec x+\tan x)+c$

4. $\int \text{cosec}^2 x\,dx$ is equal to **[MP PET 1999]**

(a) $\cot x+C$ (b) $-\cot x+C$ (c) $\tan^2 x+C$ (d) $-\cot^2 x+C$

5. $\int \sec x\tan x\,dx =$ **[Rajasthan PET 2003]**

(a) $\sec x+\tan x+C$ (b) $\sec x+C$ (c) $\tan x+C$ (d) $-\sec x+C$

6. $\int\frac{\sin x+\cos x}{\sqrt{1+\sin 2x}}dx =$ **[MP PET 1990]**

(a) $\sin x+c$ (b) $\cos x+c$ (c) $x+c$ (d) x^2+c

7. $\int(3\text{cosec}^2 x+2\sin 3x)dx =$ **[AI CBSE 1981]**

(a) $3\cot x+\frac{2}{3}\cos 3x+c$ (b) $-\left(3\cot x+\frac{2}{3}\cos 3x\right)+c$ (c) $3\cot x-\frac{2}{3}\cos 3x+c$ (d) None of these

8. $\int\frac{1+\cos^2 x}{\sin^2 x}dx =$ **[MP PET 1993; Ranchi BIT 1982]**

(a) $-\cot x-2x+c$ (b) $-2\cot x-2x+c$ (c) $-2\cot x-x+c$ (d) $-2\cot x+x+c$

9. The value of $\int\cot x\,dx$ is **[Rajasthan PET 1995]**

(a) $\log\cos x+c$ (b) $\log\tan x+c$ (c) $\log\sin x+c$ (d) $\log\sec x+c$

10. The value of $\int\frac{1}{(x-5)^2}dx$ is

(a) $\frac{1}{x-5}+c$ (b) $-\frac{1}{x-5}+c$ (c) $\frac{2}{(x-5)^3}+c$ (d) $-2(x-5)^3+c$

11. $\int \frac{x^2}{x^2+4}dx$ equals to **[Rajasthan PET 2001]**

(a) $x-2\tan^{-1}(x/2)+c$ (b) $x+2\tan^{-1}(x/2)+c$ (c) $x-4\tan^{-1}(x/2)+c$ (d) $x+4\tan^{-1}(x/2)+c$

12. $\int x^2\sec x^3 dx =$ **[MNR 1986; Roorkee 1975]**

(a) $\log(\sec x^3+\tan x^3)$ (b) $3(\sec x^3+\tan x^3)$ (c) $\frac{1}{3}\log(\sec x^3+\tan x^3)$ (d) None of these

13. $\int \frac{\cos 2x-1}{\cos 2x+1}dx =$ **[MP PET 2000]**

(a) $\tan x-x+c$ (b) $x+\tan x+c$ (c) $x-\tan x+c$ (d) $-x-\cot x+c$

14. $\int \sin^{-1}(\cos x)dx =$

(a) $\frac{\pi x}{2}$ (b) $\frac{\pi x^2}{2}$ (c) $\frac{\pi x-x^2}{2}$ (d) $\frac{\pi x+x^2}{2}$

15. $\int(\sin^{-1}x+\cos^{-1}x)dx =$ **[MP PET 1990]**

(a) $\frac{1}{2}\pi x+c$ (b) $x(\sin^{-1}x-\cos^{-1}x)+c$ (c) $x(\cos^{-1}x+\sin^{-1}x)+c$ (d) $\frac{\pi}{2}+x+c$

16. $\int x^{51}(\tan^{-1}x+\cot^{-1}x)dx =$ **[MP PET 1991]**

(a) $\frac{x^{52}}{52}(\tan^{-1}x+\cot^{-1}x)+c$ (b) $\frac{x^{52}}{52}(\tan^{-1}x-\cot^{-1}x)+c$

(c) $\frac{\pi x^{52}}{104}+\frac{\pi}{2}+c$ (d) $\frac{\pi x^{52}}{52}+\frac{\pi}{2}+c$

17. The value of $\int \frac{1}{x^4}dx$ is **[Rajasthan PET 1995]**

(a) $\frac{1}{-3x^3}+c$ (b) $\frac{1}{3x^3}+c$ (c) $\frac{1}{-4x^3}+c$ (d) $-\frac{1}{3x^3}+c$

18. $\int a^x dx =$ **[Rajasthan PET 2003]**

(a) $\frac{a^x}{\log a}+C$ (b) $a^x\log a+C$ (c) $\log a+c$ (d) a^x+C

19. $\int a^x da =$ **[MP PET 1994, 96]**

(a) $\frac{a^x}{\log_e a}+C$ (b) $a^x\log_e a+C$ (c) $\frac{a^x}{x+1}+C$ (d) None of these

20. $\int 13^x dx$ = **[Kerala (Engg.) 2002]**

(a) $\frac{13^x}{\log 13}+C$ (b) $13^{x+1}+C$ (c) $14x+C$ (d) $14^{x+1}+C$

21. $\int e^{x\log a}.e^x dx$ is equal to

(a) $(ae)^x$ (b) $\frac{(ae)^x}{\log(ae)}$ (c) $\frac{e^x}{1+\log a}$ (d) None of these

22. $\int a^{3x+3}dx =$ **[Roorkee 1977]**

(a) $\frac{a^{3x+3}}{\log a}+c$ (b) $\frac{a^{3x+3}}{3\log a}+c$ (c) $a^{3x+3}\log a+c$ (d) $3a^{3x+3}\log a+c$

23. $\int e^{\log(\sin x)}dx =$ **[MP PET 1995]**

(a) $\sin x+c$ (b) $-\cos x+c$ (c) $e^{\log\cos x}+c$ (d) None of these

24. The value of $\int e^{m\log x}dx$ is

(a) $\frac{x^{m+1}}{m+1}+k$ (b) $\frac{e^{m\log x}}{m}+k$ (c) $\frac{e^m}{\log x}+k$ (d) $\frac{e^m}{x}+k$

25. $\int \frac{e^{5\log x}-e^{4\log x}}{e^{3\log x}-e^{2\log x}}dx =$ **[MNR 1985]**

(a) $e.3^{-3x}+c$ (b) $e^3\log x+c$ (c) $\frac{x^3}{3}+c$ (d) None of these

26. If $f'(x)=\frac{1}{x}+x$ and $f(1)=\frac{5}{2}$, then $f(x)=$

(a) $\log x+\frac{x^2}{2}+2$ (b) $\log x+\frac{x^2}{2}+1$ (c) $\log x-\frac{x^2}{2}+2$ (d) $\log x-\frac{x^2}{2}+1$

27. $\int \sqrt{1+\sin x}\,dx =$ **[MP PET 1995]**

(a) $\frac{1}{2}\left(\sin\frac{x}{2}+\cos\frac{x}{2}\right)+c$ (b) $\frac{1}{2}\left(\sin\frac{x}{2}-\cos\frac{x}{2}\right)+c$ (c) $2\sqrt{1+\sin x}+c$ (d) $-2\sqrt{1-\sin x}+c$

28. $\int \sqrt{1+\sin\frac{x}{2}}\,dx =$ **[IIT 1980; MP PET 1989]**

(a) $\frac{1}{4}\left(\cos\frac{x}{4}-\sin\frac{x}{4}\right)+c$ (b) $4\left(\cos\frac{x}{4}-\sin\frac{x}{4}\right)+c$ (c) $4\left(\sin\frac{x}{4}-\cos\frac{x}{4}\right)+c$ (d) $4\left(\sin\frac{x}{4}+\cos\frac{x}{4}\right)+c$

29. $\int \sqrt{1-\sin 2x}\,dx = \ldots\ldots\ldots\ldots, x\in(0,\pi/4)$ **[MP PET 1987]**

(a) $-\sin x+\cos x$ (b) $\sin x-\cos x$ (c) $\tan x+\sec x$ (d) $\sin x+\cos x$

30. $\int \frac{dx}{1-\sin x} =$ **[MP PET 1991]**

(a) $x+\cos x+c$ (b) $1+\sin x+c$ (c) $\sec x-\tan x+c$ (d) $\sec x+\tan x+c$

31. $\int \frac{\cos x-1}{\cos x+1}dx =$ **[MP PET 1989, 92]**

(a) $2\tan\frac{x}{2}-x+c$ (b) $\frac{1}{2}\tan\frac{x}{2}-x+c$ (c) $x-\frac{1}{2}\tan\frac{x}{2}+c$ (d) $x-2\tan\frac{x}{2}+c$

32. $\int \sqrt{1+\cos x}\,dx$ equals **[Rajasthan PET 1996]**

(a) $2\sqrt{2}\sin\frac{x}{2}+c$ (b) $-2\sqrt{2}\sin\frac{x}{2}+c$ (c) $-2\sqrt{2}\cos\frac{x}{2}+c$ (d) $2\sqrt{2}\cos\frac{x}{2}+c$

33. $\int \frac{dx}{\sqrt{x}+\sqrt{x-2}} =$ **[MP PET 1990]**

(a) $\frac{1}{3}\left[x^{3/2}-(x-2)^{3/2}\right]+c$ (b) $\frac{2}{3}\left[x^{3/2}-(x-2)^{3/2}\right]+c$ (c) $\frac{1}{3}\left[(x-2)^{3/2}-x^{3/2}\right]+c$ (d) $\frac{2}{3}\left[(x-2)^{3/2}-x^{3/2}\right]+c$

34. $\int \frac{dx}{\sqrt{x+a}+\sqrt{x+b}} =$ **[AISSE 1989]**

(a) $\frac{2}{3(b-a)}\left[(x+a)^{3/2}-(x+b)^{3/2}\right]+c$ (b) $\frac{2}{3(a-b)}\left[(x+a)^{3/2}-(x+b)^{3/2}\right]+c$

(c) $\frac{2}{3(a-b)}\left[(x+a)^{3/2}+(x+b)^{3/2}\right]+c$ (d) None of these

35. $\int \frac{3x^3-2\sqrt{x}}{x}dx =$ **[Roorkee 1976]**

(a) $x^3-\sqrt{x}+c$ (b) $x^3+\sqrt{x}+c$ (c) $x^3-2\sqrt{x}+c$ (d) $x^3-4\sqrt{x}+c$

36. $\int \frac{5(x^6+1)}{x^2+1}dx =$

(a) $5(x^7+x)\tan^{-1}x+c$ (b) $x^5-\frac{5}{3}x^3+5x+c$

(c) $3x^4-5x^2+15x+c$ (d) $5\tan^{-1}(x^2-1)+\log(x^2+1)+c$

37. $\int \frac{dx}{\tan x+\cot x} =$ **[MP PET 1991]**

(a) $\frac{\cos 2x}{4}+c$ (b) $\frac{\sin 2x}{4}+c$ (c) $-\frac{\sin 2x}{4}+c$ (d) $-\frac{\cos 2x}{4}+c$

38. $\int\left(2\sin x+\frac{1}{x}\right)dx$ is equal to **[MP PET 1999]**

(a) $-2\cos x+\log x+C$ (b) $2\cos x+\log x+C$ (c) $-2\sin x-\frac{1}{x^2}+C$ (d) $-2\cos x+\frac{1}{x^2}+C$

39. $\int \sin 2x\ \cos 3x\,dx =$ **[Roorkee 1976]**

(a) $\frac{1}{2}\left(\cos x+\frac{1}{5}\cos 5x\right)+c$ (b) $\frac{1}{2}\left(\cos x-\frac{1}{5}\cos 5x\right)+c$ (c) $\cos x+\frac{1}{5}\cos 5x+c$ (d) $\cos x-\frac{1}{5}\cos 5x+c$

40. If $\int(\sin 2x-\cos 2x)dx=\frac{1}{\sqrt{2}}\sin(2x-a)+b$, then **[Roorkee 1978; MP PET 2001]**

(a) $a=\frac{\pi}{4}, b=0$ (b) $a=-\frac{\pi}{4}, b=0$ (c) $a=\frac{5\pi}{4}, b=$ any constant (d) $a=-\frac{5\pi}{4}, b=$ any constant

41. If $\int(\sin 2x+\cos 2x)dx=\frac{1}{\sqrt{2}}\sin(2x-c)+a$, then the value of a and c is **[Roorkee 1978]**

(a) $c=\frac{\pi}{4}$ and $a=k$ (an arbitrary constant) (b) $c=-\frac{\pi}{4}$ and $a=\frac{\pi}{2}$

(c) $c=\frac{\pi}{2}$ and a is an arbitrary constant (d) None of these

42. If $\int \sin 5x\cos 3x\,dx=-\frac{\cos 8x}{16}+A$, then A= **[MP PET 1992]**

(a) $\frac{\sin 2x}{16}+$ constant (b) $-\frac{\cos 2x}{4}+$ constant (c) Constant (d) None of these

43. If $\int\sqrt{2}\sqrt{1+\sin x}\,dx=-4\cos(ax+b)+C$ then the value of (a,b) is **[UPSEAT 2002]**

(a) $\frac{1}{2},\frac{\pi}{4}$ (b) $1,\frac{\pi}{2}$ (c) 1,1 (d) None of these

44. $\int \frac{\sin x + \text{cosec } x}{\tan x} dx =$

(a) $\sin x - \text{cosec } x + c$ (b) $\text{cosec } x - \sin x + c$ (c) $\log \tan x + c$ (d) $\log \cot x + c$

45. $\int \frac{1}{\sqrt{1+\sin x}} dx =$ **[Rajasthan PET 1996]**

(a) $2\sqrt{2} \log \tan\left(\frac{\pi}{8} + \frac{x}{4}\right) + c$ (b) $\frac{1}{\sqrt{2}} \log \tan\left(\frac{\pi}{8} + \frac{x}{4}\right) + c$ (c) $\sqrt{2} \log \tan\left(\frac{\pi}{8} + \frac{x}{4}\right) + c$ (d) $\frac{1}{2\sqrt{2}} \log \tan\left(\frac{\pi}{8} + \frac{x}{4}\right) + c$

46. $\int \frac{\sin^2 x - \cos^2 x}{\sin^2 x \cos^2 x} dx =$ **[MP PET 1996]**

(a) $\tan x + \cot x + c$ (b) $\tan x + \text{cosec } x + c$ (c) $-\tan x + \cot x + c$ (d) $\tan x + \sec x + c$

47. $\int \frac{1 - \tan x}{1 + \tan x} dx =$ **[MP PET 1994]**

(a) $\log \sec\left(\frac{\pi}{4} - x\right) + c$ (b) $\log \cos\left(\frac{\pi}{4} + x\right) + c$ (c) $\log \sin\left(\frac{\pi}{4} + x\right) + c$ (d) None of these

48. $\int \frac{\cos 2x}{\cos x} dx$ is equal to **[Rajasthan PET 1991]**

(a) $2 \sin x + \log(\sec x - \tan x) + c$ (b) $2 \sin x - \log(\sec x - \tan x) + c$

(c) $2 \sin x + \log(\sec x + \tan x) + c$ (d) $2 \sin x - \log(\sec x + \tan x) + c$

49. $\int \frac{(1+x)^3}{\sqrt{x}} dx$ equals **[Rajasthan PET 1990]**

(a) $\frac{2}{7}x^{7/2} + \frac{6}{5}x^{5/2} + 2x^{3/2} + 2x^{1/2} + c$ (b) $\frac{2}{5}x^{7/2} + 2x^{5/2} + 6x^{3/2} + 2x^{1/2} + c$

(c) $\frac{2}{7}x^{7/2} - \frac{6}{5}x^{5/2} + 2x^{3/2} - 2x^{1/2} + c$ (d) None of these

50. $\int \frac{dx}{9x^2 - 4} =$

(a) $\frac{1}{12} \log \left|\frac{3x+2}{3x-2}\right| + c$ (b) $\frac{1}{6} \log \left|\frac{3x+2}{3x-2}\right| + c$ (c) $\frac{1}{12} \log \left|\frac{3x-2}{3x+2}\right| + c$ (d) $\frac{1}{6} \log \left|\frac{3x-2}{3x+2}\right| + c$

51. $\int \frac{dx}{a^2 - x^2}$ is equal to **[DCE 2002]**

(a) $\frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right)$ (b) $\frac{1}{2a} \sin\left(\frac{a-x}{a+x}\right)$ (c) $\frac{1}{2a} \log\left(\frac{a+x}{a-x}\right)$ (d) $\frac{1}{2a} \log\left(\frac{a-x}{a+x}\right)$

52. $\int \sqrt{x^2 + a^2}\, dx$ is equal to **[Rajasthan PET 2001]**

(a) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2} \log\{x + \sqrt{x^2+a^2}\} + C$ (b) $\frac{x}{2}\sqrt{x^2+a^2} + \frac{a^2}{2} \log\{x + \sqrt{x^2+a^2}\} + C$

(c) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2} \log\{x - \sqrt{x^2+a^2}\} + C$ (d) $\frac{x}{2}\sqrt{x^2+a^2} + \frac{a^2}{2} \log\{x - \sqrt{x^2+a^2}\} + C$

53. $\int \frac{dx}{4x^2 + 9} =$ **[MP PET 1991; Roorkee 1977; MNR 1974]**

(a) $\frac{1}{2} \tan^{-1}\left(\frac{2x}{3}\right) + c$ (b) $\frac{3}{2} \tan^{-1}\left(\frac{2x}{3}\right) + c$ (c) $\frac{1}{6} \tan^{-1}\left(\frac{2x}{3}\right) + c$ (d) $\frac{1}{6} \tan^{-1}\left(\frac{3x}{2}\right) + c$

54. $\int (x-a)(x-b)(x-c)\ldots\ldots\ldots.(x-z)dx$ is equal to

(a) Constant (b) $5c + 5d + x$ (c) o (d) None of these

55. If $f'(x)=\sqrt{x}$ and $f(1)=2$, then $f(x)=$

(a) $\sqrt{x}+2$ (b) $x\sqrt{x}+2$ (c) $\frac{3}{2}(x\sqrt{x}+2)$ (d) $\frac{2}{3}(x\sqrt{x}+2)$

56. If $f(x)=\int x^{m-1}dx$ then $f^{(m+1)}x=0$, where

(a) m is a negatve integer (b) $m=0$ (c) m is not an integer (d)

57. A primitive of $|x|$, when $x<0$ is **[SCRA 1999]**

(a) $\frac{1}{2}x^2+c$ (b) $\frac{-1}{2}x^2+c$ (c) $x+c$ (d) $-x+c$

58. $\int\frac{\text{cosec}\,\theta-\cot\theta}{\text{cosec}\,\theta+\cot\theta}d\theta=$

(a) $2\text{cosec}\,\theta-2\cot\theta-\theta+c$ (b) $2\cos ec\,\theta-2\cot\theta+\theta+c$ (c) $2\cos ec\,\theta+2\cot\theta-\theta+c$ (d) None of these

59. $\int(e^{a\log x}+e^{x\log a})dx=$

(a) $x^{a+1}+\frac{a^x}{\log a}+c$ (b) $\frac{x^{a+1}}{a+1}+a^x\log a+c$ (c) $\frac{x^{a+1}}{a+1}+\frac{a^x}{\log a}+c$ (d) None of these

60. $\int\frac{dx}{4\cos^3 2x-3\cos 2x}=$

(a) $\frac{1}{3}\log[\sec 6x+\tan 6x]+c$ (b) $\frac{1}{6}\log[\sec 6x+\tan 6x]+c$ (c) $\log[\sec 6x+\tan 6x]+c$ (d) None of these

Advance Level

61. $\int\frac{dx}{\sin^2 x\cos^2 x}=$ **[Roorkee1976; Rajasthan PET 1991]**

(a) $\tan x+\cot x+c$ (b) $\cot x-\tan x+c$ (c) $\tan x-\cot x+c$ (d) None of these

62. $\int\frac{\cos 2x-\cos 2\alpha}{\cos x-\cos\alpha}dx=$ **[MP PET 1994]**

(a) $2[\sin x+x\cos\alpha]+c$ (b) $2[\sin x+\sin\alpha]+c$ (c) $2[-\sin x+x\cos\alpha]+c$ (d) $-2[\sin x+\sin\alpha]+c$

63. $\int\frac{\sin^8 x-\cos^8 x}{1-2\sin^2 x\cos^2 x}dx=$ **[IIT 1986]**

(a) $\sin 2x+c$ (b) $-\frac{1}{2}\sin 2x+c$ (c) $\frac{1}{2}\sin 2x+c$ (d) $-\sin 2x+c$

64. $\{1+2\tan x(\tan x+\sec x)\}^{1/2}$ **[Roorkee 1987]**

(a) $\log(\sec x+\tan x)+c$ (b) $\log(\sec x+\tan x)^{1/2}+c$ (c) $\log\sec x(\sec x+\tan x)+c$ (d) None of these

65. If $\int\frac{\cos 4x+1}{\cot x-\tan x}dx=A\cos 4x+B$, then

(a) $A=\frac{-1}{2}$ (b) $A=\frac{-1}{8}$ (c) $A=\frac{-1}{4}$ (d) None of these

66. If $x=f''(t)\cos t+f'(t)\sin t, y=-f''(t)\sin t+f'(t)\cos t$, then $\int\left[\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2\right]^{1/2}dt$ is equal to **[SCRA 1999]**

(a) $f'(t)+f''(t)+c$ (b) $f''(t)+f'''(t)+c$ (c) $f(t)+f''(t)+c$ (d) $f'(t)-f''(t)+c$

67. If $f(0) = f'(0) = 0$ and $f''(x) = \tan^2 x$ then $f(x)$ is

(a) $\log \sec x - \frac{1}{2}x^2$ (b) $\log \cos x + \frac{1}{2}x^2$ (c) $\log \sec x + \frac{1}{2}x^2$ (d) None of these

68. $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx$ is equal to

(a) $\frac{-1}{\sin x + \cos x} + C$ (b) $\log(\sin x + \cos x) + C$ (c) $\log(\sin x - \cos x) + C$ (d) $\log(\sin x + \cos x)^2 + C$

69. If $\int \frac{\cos^4 x}{\sin^2 x} dx = A \cot x + b \sin 2x + C\frac{x}{2} + D$, then

(a) $A = -2$ (b) $B = -1/4$ (c) $C = -3$ (d) None of these

70. $\int \frac{\tan x}{\sec x + \tan x} dx =$

(a) $\sec x + \tan x - x + c$ (b) $\sec x - \tan x + x + c$ (c) $\sec x + \tan x + x + c$ (d) $-\sec x - \tan x + x + c$

Integration by substitution

Basic Level

71. A primitive of $\frac{x}{x^2+1}$ is **[SCRA 1996]**

(a) $\log_e(x^2+1)$ (b) $x \tan^{-1} x$ (c) $\frac{\log_e(x^2+1)}{2}$ (d) $\frac{1}{2} x \tan^{-1} x$

72. The value of $\int \frac{x^3}{\sqrt{1+x^4}} dx$ is **[SCRA 1996]**

(a) $(1+x^4)^{1/2} + c$ (b) $-(1+x^4)^{1/2} + c$ (c) $\frac{1}{2}(1+x^4)^{1/2} + c$ (d) $-\frac{1}{2}(1+x^4)^{1/2} + c$

73. $\int \sqrt{\frac{1+x}{1-x}} dx =$ **[Rajasthan PET 2002]**

(a) $-\sin^{-1} x - \sqrt{1-x^2} + c$ (b) $\sin^{-1} x + \sqrt{1-x^2} + c$ (c) $\sin^{-1} x - \sqrt{1-x^2} + c$ (d) $-\sin^{-1} x - \sqrt{x^2-1} + c$

74. $\int x^x (1 + \log x) dx$ is equal to

(a) x^x (b) x^{2x} (c) $x^x \log x$ (d) $\frac{1}{2}(1 + \log x)^2$

75. $\int \frac{(x+1)(x + \log x)^2}{x} dx =$ **[AI CBSE 1986]**

(a) $\frac{1}{3}(x + \log x) + c$ (b) $\frac{1}{3}(x + \log x)^2 + c$ (c) $\frac{1}{3}(x + \log x)^3 + c$ (d) None of these

76. $\int \frac{x^2+1}{x(x^2-1)} dx$ is equal to **[MP PET 1999]**

(a) $\log \frac{x^2-1}{x} + C$ (b) $-\log \frac{x^2-1}{x} + C$ (c) $\log \frac{x}{x^2+1} + C$ (d) $-\log \frac{x}{x^2+1} + C$

77. $\int \frac{1}{x^2(x^4+1)^{3/4}}dx =$ **[IIT 1984; Rajasthan PET 2000; UPSEAT 2001]**

(a) $\frac{(x^4+1)^{1/4}}{x}+c$ (b) $-\frac{(x^4+1)^{1/4}}{x}+c$ (c) $\frac{3}{4}\frac{(x^4+1)^{3/4}}{x}+c$ (d) $\frac{\frac{4}{3}(x^4+1)^{3/4}}{x}+c$

78. $\int x\cos x^2\,dx$ is equal to **[MP PET 1999]**

(a) $-\frac{1}{2}\sin^2 x+C$ (b) $\frac{1}{2}\sin^2 x+C$ (c) $-\frac{1}{2}\sin x^2+C$ (d) $\frac{1}{2}\sin x^2+C$

79. $\int e^{-x}\,\text{cosec}^2(2e^{-x}+5)dx =$ **[AISSE 1988]**

(a) $\frac{1}{2}\cot(2e^{-x}+5)+c$ (b) $-\frac{1}{2}\cot(2e^{-x}+5)+c$ (c) $2\cot(2e^{-x}+5)+c$ (d) $-2\cot(2e^{-x}+5)+c$

80. $\int \frac{1+\tan x}{x+\log\sec x}dx =$ **[AI CBSE 1986]**

(a) $\log(x+\log\sec x)+c$ (b) $-\log(x+\log\sec x)+c$ (c) $\log(x-\log\sec x)+c$ (d) None of these

81. $\int \frac{x^3}{\sqrt{x^2+2}}dx =$

(a) $\frac{1}{3}(x^2+2)^{3/2}+2(x^2+2)^{1/2}+c$ (b) $\frac{1}{3}(x^2+2)^{3/2}-2(x^2+2)^{1/2}+c$

(c) $\frac{1}{3}(x^2+2)^{3/2}+(x^2+2)^{1/2}+c$ (d) $\frac{1}{3}(x^2+2)^{3/2}-(x^2+2)^{1/2}+c$

82. $\int x^3\sqrt{3+5x^4}\,dx =$ **[DSSE 1982]**

(a) $(3+5x^4)^{3/2}+c$ (b) $\frac{1}{5}(3+5x^4)^{3/2}+c$ (c) $\frac{1}{30}(3+5x^4)^{3/2}+c$ (d) None of these

83. $\int \sin^2 x\cos x\,dx$ is equal to **[SCRA 1996]**

(a) $\frac{\cos^2 x}{2}$ (b) $\frac{\sin^2 x}{3}$ (c) $\frac{\sin^3 x}{3}$ (d) $-\frac{\cos^2 x}{2}$

84. $\int \frac{(1+\log x)^2}{x}dx =$ **[Roorkee1977]**

(a) $(1+\log x)^3+c$ (b) $3(1+\log x)^3+c$ (c) $\frac{1}{3}(1+\log x)^3+c$ (d) None of these

85. $\int \frac{\sin x\,dx}{(a+b\cos x)^2} - =$

(a) $\frac{1}{b}(a+b\cos x)+c$ (b) $\frac{1}{b(a+b\cos x)}+c$ (c) $\frac{1}{b}\log(a+b\cos x)+c$ (d) None of these

86. $\int \cos^2(ax+b)\sin(ax+b)dx =$ **[DSSE 1979]**

(a) $-\frac{\cos^3(ax+b)}{3a}+c$ (b) $\frac{\cos^3(ax+b)}{3a}+c$ (c) $\frac{\sin^3(ax+b)}{3a}+c$ (d) $-\frac{\sin^3(ax+b)}{3a}+c$

87. $\int \frac{1+\tan^2 x}{1-\tan^2 x}dx$ equals to **[Rajasthan PET 2001]**

(a) $\log\left(\frac{1-\tan x}{1+\tan x}\right)+C$ (b) $\log\left(\frac{1+\tan x}{1-\tan x}\right)+C$ (c) $\frac{1}{2}\log\left(\frac{1-\tan x}{1+\tan x}\right)+C$ (d) $\frac{1}{2}\log\left(\frac{1+\tan x}{1-\tan x}\right)+C$

88. $\int \frac{a^{\sqrt{x}}}{\sqrt{x}} dx =$ **[Roorkee 1990; MP PET 2001]**

(a) $2a^{\sqrt{x}} \log_e a + c$ (b) $2a^{\sqrt{x}} \log_a e + c$ (c) $2a^{\sqrt{x}} \log_{10} a + c$ (d) $2a^{\sqrt{x}} \log_a 10 + c$

89. $\int \frac{t}{e^{3t^2}} dt =$ **[MP PET 1997]**

(a) $\frac{1}{6} e^{3t^2} + c$ (b) $-\frac{1}{6} e^{3t^2} + c$ (c) $\frac{1}{6} e^{-3t^2} + c$ (d) $-\frac{1}{6} e^{-3t^2} + c$

90. $\int x e^{x^2} dx =$ **[SCRA 1996; Rajasthan PET 2003]**

(a) $-\frac{e^{x^2}}{2} + C$ (b) $\frac{e^{x^2}}{2} + C$ (c) $\frac{e^x}{2} + C$ (d) $-\frac{e^x}{2} + C$

91. $\int e^{\sqrt{x}} dx$ is equal to **[MP PET 1988]**

(a) $e^{\sqrt{x}} + A$ (b) $\frac{1}{2} e^{\sqrt{x}} + A$ (c) $2(\sqrt{x} - 1)e^{\sqrt{x}} + A$ (d) $2(\sqrt{x} + 1)e^{\sqrt{x}} + A$

(A is an arbitrary constant)

92. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx =$ **[DCE 1999]**

(a) $e^{\sqrt{x}}$ (b) $\frac{e^{\sqrt{x}}}{2}$ (c) $2e^{\sqrt{x}}$ (d) $\sqrt{x} e^{\sqrt{x}}$

93. $\int \frac{a\,dx}{b + ce^x} =$ **[MP PET 1988; BIT Ranchi 1978]**

(a) $\frac{a}{b} \log\left[\frac{e^x}{b + ce^x}\right] + k$ (b) $\frac{a}{b} \log\left[\frac{b + ce^x}{e^x}\right] + k$ (c) $\frac{b}{a} \log\left[\frac{e^x}{b + ce^x}\right] + k$ (d) $\frac{b}{a} \log\left[\frac{b + ce^x}{e^x}\right] + k$

94. $\int \frac{1}{(e^x + e^{-x})^2} dx =$

(a) $-\frac{1}{2(e^{2x} + 1)} + c$ (b) $\frac{1}{2(e^{2x} + 1)} + c$ (c) $-\frac{1}{e^{2x} + 1} + c$ (d) None of these

95. $\int \frac{e^{2x} - 1}{e^{2x} + 1} dx =$ **[MP PET 1987]**

(a) $\frac{e^{2x} - 1}{e^{2x} + 1} + c$ (b) $\log(e^{2x} + 1) - x + c$ (c) $\log(e^{2x} + 1) + c$ (d) None of these

96. $\int \frac{e^{2x} + 1}{e^{2x} - 1} dx$ equals **[Rajasthan PET 1996]**

(a) $\log(e^x - e^{-x}) + c$ (b) $\log(e^x + e^{-x}) + c$ (c) $\log(e^{-x} - e^x) + c$ (d) $\log(1 - e^{-x}) + c$

97. $\int \frac{dx}{e^x + e^{-x}} =$ **[Bihar CEE 1997; MNR 1974]**

(a) $\tan^{-1}(e^{-x})$ (b) $\tan^{-1}(e^x)$ (c) $\log(e^x - e^{-x})$ (d) $\log(e^x + e^x)$

98. What is the value of the integral $I = \int \frac{dx}{(1 + e^x)(1 + e^{-x})}$ **[DCE 1999]**

(a) $\frac{-1}{1 + e^x}$ (b) $\frac{e^x}{1 + e^x}$ (c) $\frac{1}{1 + e^x}$ (d) None of these

99. $\int e^{3\log x}(x^4+1)^{-1}dx =$ **[MP PET 2001]**

(a) $\log(x^4+1)+c$ (b) $\frac{1}{4}\log(x^4+1)+c$ (c) $-\log(x^4+1)+c$ (d) None of these

100. $\int \frac{e^{\tan^{-1}x}}{1+x^2}dx =$ **[MP PET 1987]**

(a) $\log(1+x^2)-c$ (b) $\log e^{\tan^{-1}x}+c$ (c) $e^{\tan^{-1}x}+c$ (d) $\tan^{-1}e^{\tan^{-1}x}+c$

101. $\int \frac{e^{m\tan^{-1}x}}{1+x^2}dx$ equals to **[Rajasthan PET 2001]**

(a) $e^{\tan^{-1}x}$ (b) $\frac{1}{m}e^{\tan^{-1}x}$ (c) $\frac{1}{m}e^{m\tan^{-1}x}$ (d) None of these

102. $\int e^{\cos^2 x}\sin 2x\,dx =$ **[AI CBSE 1995]**

(a) $e^{\cos^2 x}+c$ (b) $-e^{\cos^2 x}+c$ (c) $\frac{1}{2}e^{\cos^2 x}+c$ (d) None of these

103. $\int e^x \sin(e^x)dx =$ **[MP PET 1995]**

(a) $-\cos e^x+c$ (b) $\cos e^x+c$ (c) $-\operatorname{cosec} e^x+c$ (d) None of these

104. $\int \frac{dx}{e^x-1} =$ **[MP PET 1989]**

(a) $\ln(1-e^{-x})+c$ (b) $-\ln(1-e^{-x})+c$ (c) $\ln(e^x-1)+c$ (d) None of these

105. The value of $\int\left(1+\frac{1}{x^2}\right)e^{\left(x-\frac{1}{x}\right)}dx$ equals **[Kurukshetra CEE 1998]**

(a) $e^{x-\frac{1}{x}}+c$ (b) $e^{x+\frac{1}{x}}+c$ (c) $e^{x^2-\frac{1}{x}}+c$ (d) $e^{x^2+\frac{1}{x^2}}+c$

106. $\int \frac{x^2}{\sqrt{1-x^3}}dx$ equals **[Rajasthan PET 1987]**

(a) $\frac{2}{3}\sqrt{1-x^3}+c$ (b) $\frac{-2}{3}\sqrt{1-x^3}+c$ (c) $\frac{1}{3}\sqrt{1-x^3}+c$ (d) $\frac{-1}{3}\sqrt{1-x^3}+c$

107. $\int \frac{x}{1+x^4}dx =$ **[IIT 1978; UPSEAT 2002]**

(a) $\frac{1}{2}\cot^{-1}x^2+c$ (b) $\frac{1}{2}\tan^{-1}x^2+c$ (c) $\cot^{-1}x^2+c$ (d) $\tan^{-1}x^2+c$

108. $\int \frac{3x^2}{x^6+1}dx =$ **[MNR 19981; MP PET 1988; Rajasthan PET 1995]**

(a) $\log(x^6+1)+c$ (b) $\tan^{-1}(x^3)+c$ (c) $3\tan^{-1}(x^3)+c$ (d) $3\tan^{-1}\left(\frac{x^3}{3}\right)+c$

109. $\int \frac{1}{\sqrt{1-e^{2x}}}dx =$ **[MP PET 1993, 2002; Rajasthan PET 1999]**

(a) $x-\log[1+\sqrt{1-e^{2x}}]+c$ (b) $x+\log[1+\sqrt{1-e^{2x}}]+c$ (c) $\log[1+\sqrt{1-e^{2x}}]-x+c$ (d) None of these

110. $\int \frac{\sec^2 x\,dx}{\sqrt{\tan^2 x+4}} =$

(a) $\log\left[\tan x+\sqrt{\tan^2 x+4}\right]+c$ (b) $\frac{1}{2}\log\left[\tan x+\sqrt{\tan^2 x+4}\right]+c$

(c) $\log\left[\frac{1}{2}\tan x+\frac{1}{2}\sqrt{\tan^2 x+4}\right]+c$ (d) None of these

111. $\int \cos x\sqrt{4-\sin^2 x}\;dx =$

(a) $\frac{1}{2}\sin x\sqrt{4-\sin^2 x}-2\sin^{-1}\left(\frac{1}{2}\sin x\right)+c$ (b) $\frac{1}{2}\sin x\sqrt{4-\sin^2 x}+2\sin^{-1}\left(\frac{1}{2}\sin x\right)+c$

(c) $\frac{1}{2}\sin x\sqrt{4-\sin^2 x}+\sin^{-1}\left(\frac{1}{2}\sin x\right)+c$ (d) None of these

112. $\int \frac{3x^2}{\sqrt{9-16x^6}}dx =$

(a) $\frac{1}{4}\sin^{-1}\left(\frac{4x^3}{3}\right)+c$ (b) $\frac{1}{3}\sin^{-1}\left(\frac{4x^3}{3}\right)+c$ (c) $\frac{1}{4}\sin^{-1}x^3+c$ (d) $\frac{1}{3}\sin^{-1}x^3+c$

113. $\int \frac{x}{\sqrt{4-x^4}}dx =$ **[Roorkee 1976]**

(a) $\cos^{-1}\frac{x^2}{2}$ (b) $\frac{1}{2}\cos^{-1}\frac{x^2}{2}$ (c) $\sin^{-1}\frac{x^2}{2}$ (d) $\frac{1}{2}\sin^{-1}\frac{x^2}{2}$

114. $\frac{a^x}{\sqrt{1-a^{2x}}}dx =$ **[MNR 1983, 87]**

(a) $\frac{1}{\log a}\sin^{-1}a^x+c$ (b) $\sin^{-1}a^x+c$ (c) $\frac{1}{\log a}\cos^{-1}a^x+c$ (d) $\cos^{-1}a^x+c$

115. $\int \frac{\sin x\,dx}{3+4\cos^2 x} =$ **[Karnataka CET 2000]**

(a) $\log(3+4\cos^2 x)+c$ (b) $\frac{-1}{2\sqrt{3}}\tan^{-1}\left(\frac{\cos x}{\sqrt{3}}\right)+c$ (c) $\frac{-1}{2\sqrt{3}}\tan^{-1}\left(\frac{2\cos x}{\sqrt{3}}\right)+c$ (d) $\frac{1}{2\sqrt{3}}\tan^{-1}\left(\frac{2\cos x}{\sqrt{3}}\right)+c$

116. $\int \frac{\sin 2x}{a^2+b^2\sin^2 x}dx =$ **[Roorkee 1977]**

(a) $\frac{1}{b^2}\log(a^2+b^2\sin^2 x)+c$ (b) $\frac{1}{b}\log(a^2+b^2\sin^2 x)+c$

(c) $\log(a^2+b^2\sin^2 x)+c$ (d) $b^2\log(a^2+b^2\sin^2 x)+c$

117. $\int \frac{\sin x\cos x}{a\cos^2 x+b\sin^2 x}dx =$ **[AI CBSE 1988, 89]**

(a) $\frac{1}{2(b-a)}\log(a\cos^2 x+b\sin^2 x)+c$ (b) $\frac{1}{b-a}\log(a\cos^2 x+b\sin^2 x)+c$

(c) $\frac{1}{2}\log(a\cos^2 x+b\sin^2 x)+c$ (d) None of these

118. $\int \frac{1}{x\sqrt{1+\log x}}dx$ **[Roorkee 1997]**

(a) $\frac{2}{3}(1+\log x)^{3/2}+c$ (b) $(1+\log x)^{3/2}+c$ (c) $2\sqrt{1+\log x}+c$ (d) $\sqrt{1+\log x}+c$

119. $\int \frac{dx}{x + x\log x} =$ **[MP PET 1993; Roorkee1977]**

(a) $\log(1+\log x)$ (b) $\log\log(1+\log x)$ (c) $\log x + \log(\log x)$ (d) None of these

120. $\int \frac{\sin 2x}{1+\sin^2 x}dx =$ **[Roorkee 1976]**

(a) $\log \sin 2x + c$ (b) $\log(1+\sin^2 x)+c$ (c) $\frac{1}{2}\log(1+\sin^2 x)+c$ (d) $\tan^{-1}(\sin x)+c$

121. $\int \frac{\sec^2 x}{1+\tan x}dx =$ **[MP PET 1987]**

(a) $\log(\cos x + \sin x)+c$ (b) $\log(\sec^2 x)$ (c) $\log(1+\tan x)$ (d) $-\frac{1}{(1+\tan x)^2}$

122. $\int \frac{\text{cosec}^2 x}{1+\cot x}dx =$ **[MNR 1973]**

(a) $\log(1+\cot x)+c$ (b) $-\log(1+\cot x)+c$ (c) $\frac{1}{2(1+\cot x)^2}+c$ (d) None of these

123. $\int \frac{1}{\sqrt{x}}\sin\sqrt{x}dx =$ **[MP PET 1989]**

(a) $-\frac{1}{2}\cos\sqrt{x}+c$ (b) $-2\cos\sqrt{x}+c$ (c) $\frac{1}{2}\cos\sqrt{x}+c$ (d) $2\cos\sqrt{x}+c$

124. $\int \frac{x+1}{\sqrt{1+x^2}}dx =$ **[MP PET 1991]**

(a) $\sqrt{1+x^2}+\tan^{-1}x+c$ (b) $\sqrt{1+x^2}-\log\{x+\sqrt{1+x^2}\}+c$

(c) $\sqrt{1+x^2}+\log\{x+\sqrt{1+x^2}\}+c$ (d) $\sqrt{1+x^2}+\log(\sec x+\tan x)+c$

125. $\int \frac{3^x}{\sqrt{9^x-1}}dx =$ **[EAMCET 202]**

(a) $\frac{1}{\log 3}\log|\,3^x+\sqrt{9^x-1}\,|+c$ (b) $\frac{1}{\log 3}\log|\,9^x+\sqrt{9^x-1}\,|+c$

(c) $\frac{1}{\log 9}\log|\,3^x+\sqrt{9^x-1}\,|+c$ (d) $\frac{1}{\log 9}\log|\,3^x-\sqrt{9^x-1}\,|+c$

126. To find the value of $\int \frac{1+\log x}{x}dx$, the proper substitution is **[MP PET 1988]**

(a) $\log x = t$ (b) $1+\log x = t$ (c) $\frac{1}{x}=t$ (d) None of these

127. $\int \frac{10x^9+10^x\log_e 10}{10^x+x^{10}}dx =$ **[MNR 1979]**

(a) $-\frac{1}{2}\frac{1}{(10^x+x^{10})^2}$ (b) $\log(10^x+x^{10})+c$ (c) $\frac{1}{2}\frac{1}{(10^x+x^{10})^2}+c$ (d) None of these

128. $\int \frac{\sin x}{\sin(x-\alpha)}dx =$ **[Rajasthan PET 1999; Kerala (Engg.) 2002]**

(a) $x\cos\alpha - \sin\alpha\log\sin(x-\alpha)+c$ (b) $x\cos\alpha+\sin\alpha\log\sin(x-\alpha)+c$

(c) $x\sin\alpha-\sin\alpha\log\sin(x-\alpha)+c$ (d) None of these

129. $\int \frac{2x\tan^{-1}x^2}{1+x^4}dx =$ **[Roorkee 1982]**

(a) $[\tan^{-1}x^2]^2+c$ (b) $\frac{1}{2}[\tan^{-1}x^2]^2+c$ (c) $2[\tan^{-1}x^2]^2+c$ (d) None of these

130. $\int \tan^{-1}\frac{2x}{1-x^2}dx =$ **[MP PET 1991]**

(a) $x\tan^{-1}x+c$ (b) $x\tan^{-1}x-\log(1+x^2)+c$ (c) $2x\tan^{-1}x+\log(1+x^2)+c$ (d) $2x\tan^{-1}x-\log(1+x^2)+c$

131. $\int \sin^{-1}(3x-4x^3)dx =$ **[AISSE 1986; DSSE 1984]**

(a) $x\sin^{-1}x+\sqrt{1-x^2}+c$ (b) $x\sin^{-1}x-\sqrt{1-x^2}+c$ (c) $2[x\sin^{-1}x+\sqrt{1-x^2}]+c$ (d) $3[x\sin^{-1}x+\sqrt{1-x^2}]+c$

132. The value of $\int \frac{2\,dx}{\sqrt{1-4x^2}}$ is **[Karnataka CET 2001]**

(a) $\tan^{-1}(2x)+c$ (b) $\cot^{-1}(2x)+c$ (c) $\cos^{-1}(2x)+c$ (d) $\sin^{-1}(2x)+c$

133. $\int \frac{\cot x}{\log\sin x}dx =$ **[MNR 1974]**

(a) $\log(\log\sin x)+c$ (b) $\log(\log\operatorname{cosec} x)+c$ (c) $2\log(\log\sin x)+c$ (d) None of these

134. If $\int f(x)dx = f(x)$, then $\int [f(x)]^2dx$ is **[DCE 2002]**

(a) $\frac{1}{2}[f(x)]^2$ (b) $[f(x)]^3$ (c) $\frac{[f(x)]^3}{3}$ (d) $[f(x)]^2$

135. Integral of $f(x)=\sqrt{1+x^2}$ with respect to x^2 is

(a) $\frac{2}{3}\frac{(1+x^2)^{3/2}}{x}+k$ (b) $\frac{2}{3}(1+x^2)^{3/2}+k$ (c) $\frac{2}{3}x(1+x^2)^{3/2}+k$ (d) None of these

136. $\int \frac{d(x^2+1)}{\sqrt{x^2+2}}$ is equal to

(a) $2\sqrt{x^2+2}+k$ (b) $\sqrt{x^2+2}+k$ (c) $\frac{1}{(x^2+2)^{3/2}}+k$ (d) None of these

137. $\int x\sec x^2dx$ is equal to

(a) $\frac{1}{2}\log(\sec x^2+\tan x^2)+k$ (b) $\frac{x^2}{2}\log(\sec x^2+\tan x^2)+k$

(c) $2\log(\sec x^2+\tan x^2)+k$ (d) None of these

138. $\int f'(ax+b)\{f(ax+b)\}^n dx$ is equal to

(a) $\frac{1}{n+1}\{f(ax+b)\}^{n+1}+c, \forall n$ except $n=-1$ (b) $\frac{1}{n+1}\{f(ax+b)\}^{n+1}+c, \forall n$

(c) $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1}+c, \forall n$ except $n=-1$ (d) $\frac{1}{a(n+1)}\{f(ax+b)\}^{n+1}+c, \forall n$

139. $\int \frac{\sin x-\cos x}{\sqrt{1-\sin 2x}}e^{\sin x}\cos x\,dx$ is equal to

(a) $e^{\sin x}+c$ (b) $e^{\sin x-\cos x}+c$ (c) $e^{\sin x+\cos x}+c$ (d) $e^{\cos x-\sin x}+c$

140. $\int 5^{5^{5^x}}.5^{5^x}.5^x dx$ is equal to

(a) $\frac{5^{5^x}}{(\log 5)^3}+c$ (b) $5^{5^{5^x}}(\log 5)^3+c$ (c) $\frac{5^{5^{5^x}}}{(\log 5)^3}+c$ (d) None of these

141. If $\int \frac{2x}{\sqrt{1-4^x}}dx = k\sin^{-1}(2^x)+c$, then k is equal to

(a) $\log 2$ (b) $\frac{1}{2}\log 2$ (c) $\frac{1}{2}$ (d) $\frac{1}{\log 2}$

142. $\int \frac{1}{\sqrt{\sin^3 x \cos x}}dx$ is equal to

(a) $\frac{-2}{\sqrt{\tan x}}+c$ (b) $2\sqrt{\tan x}+c$ (c) $\frac{2}{\sqrt{\tan x}}+c$ (d) $-2\sqrt{\tan x}+c$

143. $\int \frac{\sec x\,dx}{\sqrt{\cos 2x}} =$

(a) $\sin^{-1}(\tan x)$ (b) $\tan x$ (c) $\cos^{-1}(\tan x)$ (d) $\frac{\sin x}{\sqrt{\cos x}}$

144. $\int \frac{x\,dx}{1-x\cot x} =$

(a) $\log(\cos x - x\sin x)+c$ (b) $\log(x\sin x - \cos x)+c$ (c) $\log(\sin x - x\cos x)+c$ (d) None of these

145. To evaluate $\int \frac{\sec^2 x}{(1+\tan x)(2+\tan x)}dx$, the most suitable substitution is

(a) $1+\tan x = t$ (b) $2+\tan x = t$ (c) $\tan x = t$ (d) None of these

146. For which of the following functions, the substitution $x^2 = t$ is applicable

(a) $\int x^6 \tan^{-1} x^3 dx$ (b) $\int \tan^{-1}\left(\frac{2x}{1-x^2}\right)dx$ (c) $\int x^3 \cos x^2 dx$ (d) None of these

147. $\int x\sqrt{\frac{1-x^2}{1+x^2}}dx =$

(a) $\frac{1}{2}[\sin^{-1} x^2 + \sqrt{1-x^4}]+c$ (b) $\frac{1}{2}[\sin^{-1} x^2 + \sqrt{1-x^2}]+c$

(c) $\sin^{-1} x^2 + \sqrt{1-x^4}+c$ (d) $\sin^{-1} x^2 + \sqrt{1-x^2}+c$

148. $\int \frac{1}{\cos^2 x(1-\tan x)^2}dx =$

(a) $\frac{1}{\tan x - 1}+c$ (b) $\frac{1}{1-\tan x}+c$ (c) $-\frac{1}{3}\frac{1}{(1-\tan x)^3}+c$ (d) None of these

149. $\int \sec^p x \tan x\,dx =$

(a) $\frac{\sec^{p+1} x}{p+1}+c$ (b) $\frac{\sec^p x}{p}+c$ (c) $\int \frac{\tan^{p+1} x}{p+1}+c$ (d) $\frac{\tan^p x}{p}+c$

Advance Level

150. Consider the following statements: **[SCRA 1996]**

Assertion (A): $\frac{1}{x^2+a^2}$ can be integrated by a substitution $x = a\tan\theta$.

Reason (R): Because all integrands are integrated by the methodof substitution only.

Of these statements

(a) Both *A* and *R* are true and *R* is the correct explanation of *A* (b) Both *A* and *R* are true but *R* is not the correct explanation of *A*

(c) A is true but R is false (d) A is false but R is true

151. $\int \sqrt{\frac{a-x}{x}}dx =$

(a) $a\left[in^{-1}\sqrt{\frac{x}{a}}+\sqrt{\frac{x}{a}}.\sqrt{\frac{a-x}{a}}\right]+C$ (b) $a\left[\sin^{-1}\sqrt{\frac{x}{a}}-\sqrt{\frac{x}{a}}\sqrt{\frac{a-x}{a}}\right]+C$

(c) $-a\left[\sin^{-1}\sqrt{\frac{x}{a}}+\sqrt{\frac{x}{a}}\sqrt{\frac{a-x}{a}}\right]+C$ (d) None of these

152. $\int \frac{\sin x}{\sin x-\cos x}dx =$ **[Roorkee 1988]**

(a) $\frac{1}{2}\log(\sin x-\cos x)+x+c$ (b) $\frac{1}{2}[\log(\sin x-\cos x)+x]+c$

(c) $\frac{1}{2}\log(\cos x-\sin x)+x+c$ (d) $\frac{1}{2}[\log(\cos x-\sin x)+x]+c$

153. $\int \frac{1+x^2}{\sqrt{1-x^2}}dx =$ **[IIT 1977]**

(a) $\frac{3}{2}\sin^{-1}x-\frac{1}{2}x\sqrt{1-x^2}+c$ (b) $\frac{3}{2}\sin^{-1}x+\frac{1}{2}x\sqrt{1-x^2}+c$

(c) $\frac{3}{2}\cos^{-1}x-\frac{1}{2}x\sqrt{1-x^2}+c$ (d) $\frac{3}{2}\cos^{-1}x+\frac{1}{2}x\sqrt{1-x^2}+c$

154. If $I=\int \sec^4 x\,\text{cosec}^2 x\,dx = K\tan^3 x+L\tan x+M\cot x+\text{constant}$, then

(a) $K=\frac{1}{3},L=1,M=2$ (b) $K=\frac{1}{3},L=2,M=-1$ (c) $K=-1,L=0,M=1$ (d) None of these

155. $\int \frac{\log(x+1)-\log x}{x(x+1)}dx =$

(a) $-\log\left(\frac{x+1}{x}\right)+c$ (b) $-\log\left[\log\left(\frac{x+1}{x}\right)\right]+c$

(c) $-\left(\frac{1}{2}\right)\left[\log\left(\frac{x+1}{x}\right)^2\right]+c$ (d) $c-\frac{1}{2}\left[(\log(x+1))^2-(\log x)^2\right]$

156. $\int \frac{dx}{\sqrt{1+\sin x}} =$

(a) $\sqrt{2}\log\tan(x/4+\pi/8)$ (b) $\sqrt{2}\log[\text{cosec}(x/2+\pi/4)-\cot(x/2+\pi/4)]$

(c) $\sqrt{2}\log[sec(x/2-\pi/4)+\tan(x/2-\pi/4)]$ (d) All (a), (b) and (c)

157. $\int \frac{x+1}{x(1+xe^x)^2}dx = \log|1-f(x)|+f(x)+c$, then $f(x)=$

(a) $\frac{1}{x+e^x}$ (b) $\frac{1}{1+xe^x}$ (c) $\frac{1}{(1+xe^x)^2}$ (d) None of these

158. If $l^r(x)$ means $\log\log\log.....\log x$, the log being repeated r times, then $\int \frac{1}{xl(x)l^2(x)l^3(x).....l^r(x)}dx =$

(a) $l^{r+1}(x)+c$ (b) $\frac{l^{r+1}(x)}{r+1}+c$ (c) $l^r(x)+c$ (d) None of these

159. $\int x\sqrt{\left[\frac{2\sin(x^2-1)-\sin 2(x^2-1)}{2\sin(x^2-1)+\sin 2(x^2-1)}\right]}dx =$, (where $x^2-1\neq n\pi$)

(a) $\log\frac{1}{2}\sec(x^2-1)$ (b) $\log\sec\left(\frac{x^2-1}{2}\right)$ (c) $\frac{1}{2}\log\sec(x^2-1)$ (d) None of these

160. $\int\cos\left\{2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right\}dx$ is equal to

(a) $\frac{1}{8}(x^2-1)+k$ (b) $\frac{1}{2}x^2+k$ (c) $\frac{1}{2}x+k$ (d) None of these

161. Let the equation of a curve passing through the point (0,1) be given by $y=\int x^2.e^{x^3}dx$. If the equation of the curve is written in the form $x=f(y)$ then $f(y)$ is

(a) $\sqrt{\log_e(3y-2)}$ (b) $\sqrt[3]{\log_e(3y-2)}$ (c) $\sqrt[3]{\log_e(2-3y)}$ (d) None of these

162. $\int\sqrt{\frac{\cos x-\cos^3 x}{1-\cos^3 x}}dx$ is equal to

(a) $\frac{2}{3}\sin^{-1}(\cos^{3/2}x)+c$ (b) $\frac{3}{2}\sin^{-1}(\cos^{3/2}x)+c$ (c) $\frac{2}{3}\cos^{-1}(\cos^{3/2}x)+c$ (d) None of these

163. The value of $\int\frac{ax^2-b}{x\sqrt{c^2x^2-(ax^2+b)^2}}dx$ is

(a) $\sin^{-1}\left[\frac{ax+\frac{b}{x}}{c}\right]+k$ (b) $\sin^{-1}\left[\frac{ax^2+\frac{b}{x^2}}{c}\right]+k$ (c) $\cos^{-1}\left(\frac{ax+\frac{b}{x}}{c}\right)+k$ (d) $\cos^{-1}\left(\frac{ax^2+\frac{b}{x^2}}{c}\right)+k$

164. $\int\sqrt{\left(\frac{1-\sqrt{x}}{1+\sqrt{x}}\right)}dx =$ **[IIT 1985]**

(a) $\cos^{-1}\sqrt{x}+\sqrt{1-x}.(\sqrt{x}-2)+c$ (b) $\cos^{-1}\sqrt{x}-\sqrt{1-x}.(\sqrt{x}-2)+c$

(c) $\cos^{-1}\sqrt{x}+\sqrt{1-x}.(\sqrt{x-2})+c$ (d) None of these

165. $\int\frac{\sin 2x}{\sin^4 x+\cos^4 x}dx =$ **[Rajasthan PET 1995]**

(a) $\cot^{-1}(\tan^2 x)+c$ (b) $\tan^{-1}(\tan^2 x)+c$ (c) $\cot^{-1}(\cot^2 x)+c$ (d) $\tan^{-1}(\cot^2 x)+c$

166. $\int\tan^3 2x\sec 2x\,dx =$ **[IIT 1977]**

(a) $\frac{1}{6}\sec^3 2x-\frac{1}{2}\sec 2x+c$ (b) $\frac{1}{6}\sec^3 2x+\frac{1}{2}\sec 2x+c$ (c) $\frac{1}{9}\sec^2 2x-\frac{1}{3}\sec 2x+c$ (d) None of these

167. The value of $\int\frac{\sqrt{(x^2-a^2)}}{x}dx$ will be **[UPSEAT 1999]**

(a) $\sqrt{(x^2-a^2)}-\tan^{-1}\left[\frac{\sqrt{(x^2-a^2)}}{a}\right]$ (b) $\sqrt{(x^2-a^2)}+\tan^{-1}\left[\frac{\sqrt{(x^2-a^2)}}{a}\right]$

(c) $\sqrt{(x^2-a^2)}+a^2\tan^{-1}\left[\sqrt{x^2-a^2}\right]$ (d) $\tan^{-1}\frac{x}{a}+c$

Integration by Parts

Basic Level

168. $\int (1-x^2)\log x\,dx =$ **[DSSE 1982]**

(a) $\left(x-\frac{x^3}{3}\right)\log x-\left(x-\frac{x^3}{9}\right)+c$ (b) $\left(x-\frac{x^3}{3}\right)\log x+\left(x-\frac{x^3}{9}\right)+c$

(c) $\left(x+\frac{x^3}{3}\right)\log x+\left(x+\frac{x^3}{9}\right)+c$ (d) None of these

169. $\int \frac{1}{x^2}\log(x^2+a^2)dx$ **[MNR 1980]**

(a) $\frac{1}{x}\log(x^2+a^2)+\frac{2}{a}\tan^{-1}\frac{x}{a}+c$ (b) $-\frac{1}{x}\log(x^2+a^2)+\frac{2}{a}\tan^{-1}\frac{x}{a}+c$

(c) $-\frac{1}{x}\log(x^2+a^2)-\frac{2}{a}\tan^{-1}\frac{x}{a}+c$ (d) None of these

170. $\int \frac{\log x}{x^3}dx =$ **[Roorkee 1986]**

(a) $\frac{1}{4x^2}(2\log x-1)+C$ (b) $-\frac{1}{4x^2}(2\log x+1)+C$ (c) $\frac{1}{4x^2}(2\log x+1)+C$ (d) $\frac{1}{4x^2}(1-2\log x)+C$

171. $\int x^3\log x\,dx =$ **[Karnataka CET 2002]**

(a) $\frac{x^4\log x}{4}+C$ (b) $\frac{1}{16}[4x^4\log x-x^4]+C$ (c) $\frac{1}{8}[4x^4\log x-4x^2]+C$ (d) $\frac{1}{16}[4x^4\log x+x^4]+C$

172. $\int x\sin^{-1}x\,dx =$ **[MP PET 1991]**

(a) $\left(\frac{x^2}{2}-\frac{1}{4}\right)\sin^{-1}x+\frac{x}{4}\sqrt{1-x^2}+c$ (b) $\left(\frac{x^2}{2}+\frac{1}{4}\right)\sin^{-1}x+\frac{x}{4}\sqrt{1-x^2}+c$

(c) $\left(\frac{x^2}{2}-\frac{1}{4}\right)\sin^{-1}x-\frac{x}{4}\sqrt{1-x^2}+c$ (d) $\left(\frac{x^2}{2}+\frac{1}{4}\right)\sin^{-1}x-\frac{x}{4}\sqrt{1-x^2}+c$

173. $\int \cos(\log_e x)dx$ is equal to **[MP PET 2003]**

(a) $\frac{1}{2}x\{\cos(\log_e x)+\sin(\log_e x)\}$ (b) $x\{\cos(\log_e x)+\sin(\log_e x)\}$

(c) $\frac{1}{2}x\{\cos(\log_e x)-\sin(\log_2 x)\}$ (d) $x\{\cos(\log_e x)-\sin(\log_e x)\}$

174. If $\int xe^{2x}dx$ is equal to $e^{2x}f(x)+c$ where c is constant of integration, then $f(x)$ is **[UPSEAT 2001]**

(a) $(3x-1)/4$ (b) $(2x+1)/2$ (c) $(2x-1)/4$ (d) $(x-4)/6$

175. $\int e^{2x}\left(\frac{\sin 4x-2}{1-\cos 4x}\right)dx =$ **[Mathematics Olympiad 1986]**

(a) $\frac{1}{2}e^{2x}\cot 2x+c$ (b) $-\frac{1}{2}e^{2x}\cot 2x+c$ (c) $-2e^{2x}\cot 2x+c$ (d) $2e^{2x}\cot 2x+c$

176. $\int x\cos x\ dx =$ **[MP PET 1988]**

(a) $x\sin x+\cos x$ (b) $x\sin x-\cos x$ (c) $x\cos x+\sin x$ (d) $x\cos x-\sin x$

177. $\int x\cos^2 x\,dx =$ **[IIT 1972]**

(a) $\frac{x^4}{4}-\frac{1}{4}x\sin 2x-\frac{1}{8}\cos 2x+c$ (b) $\frac{x^4}{4}+\frac{1}{4}x\sin 2x+\frac{1}{8}\cos 2x+c$

(c) $\frac{x^4}{4}-\frac{1}{4}x\sin 2x+\frac{1}{8}\cos 2x+c$ (d) $\frac{x^4}{4}+\frac{1}{4}x\sin 2x-\frac{1}{8}\cos 2x+c$

178. If $\frac{d}{dx}f(x)=x\cos x+\sin x$ and $f(0)=2$, then $f(x)=$ **[MP PET 1989]**

(a) $x\sin x$ (b) $x\cos x+\sin x+2$ (c) $x\sin x+2$ (d) $x\cos x+2$

179. $\int e^{x/2}\sin\left(\frac{x}{2}+\frac{\pi}{4}\right)dx =$ **[Roorkee 1982]**

(a) $e^{x/2}\cos\frac{x}{2}+c$ (b) $\sqrt{2}\,e^{x/2}\cos\frac{x}{2}+c$ (c) $e^{x/2}\sin\frac{x}{2}+c$ (d) $\sqrt{2}\,e^{x/2}\sin\frac{x}{2}+c$

180. $\int x\sin^2 x\,dx =$ **[Ranchi BIT 1977; IIT 1972]**

(a) $\frac{x^2}{4}+\frac{x}{4}\sin 2x+\frac{1}{8}\cos 2x+c$ (b) $\frac{x^2}{4}-\frac{x}{4}\sin 2x+\frac{1}{8}\cos 2x+c$

(c) $\frac{x^2}{4}+\frac{x}{4}\sin 2x-\frac{1}{8}\cos 2x+c$ (d) $\frac{x^2}{4}-\frac{x}{4}\sin 2x-\frac{1}{8}\cos 2x+c$

181. $\int\frac{x-\sin x}{1-\cos x}dx =$ **[AISSE 1989]**

(a) $x\cot\frac{x}{2}+c$ (b) $-x\cot\frac{x}{2}+c$ (c) $\cot\frac{x}{2}+c$ (d) None of these

182. $\int x^2\sin 2x\,dx =$ **[IIT 1974]**

(a) $\frac{1}{2}x^2\cos 2x+\frac{1}{2}x\sin 2x+\frac{1}{4}\cos 2x+c$ (b) $-\frac{1}{2}x^2\cos 2x+\frac{1}{2}x\sin 2x+\frac{1}{4}\cos 2x+c$

(c) $\frac{1}{2}x^2\cos 2x-\frac{1}{2}x\sin 2x+\frac{1}{4}\cos 2x+c$ (d) None of these

183. $\int\log x\,dx =$ **[MNR 1979; Ranchi BIT 1992; SCRA 1996]**

(a) $x+x\log x+c$ (b) $x\log x-x+c$ (c) $x^2\log x+c$ (d) $\frac{1}{x}\log x+x+c$

184. $\int\log_{10} x\ dx =$ **[Roorkee 1973]**

(a) $x\log_{10} x+c$ (b) $x(\log_{10} x+\log_{10} e)+c$ (c) $\log_{10} x+c$ (d) $x(\log_{10} x-\log_{10} e)+c$

185. $\int\frac{\log x}{(1+\log x)^2}dx =$

(a) $\frac{1}{1+\log x}+c$ (b) $\frac{x}{(1+\log x)^2}+c$ (c) $\frac{x}{1+\log x}+c$ (d) $\frac{1}{(1+\log x)^2}+c$

186. $\int\left[\frac{1}{\log x}-\frac{1}{(\log x)^2}\right]dx =$

(a) $\frac{1}{\log x}+c$ (b) $\frac{x}{\log x}+c$ (c) $\frac{x}{(\log x)^2}$ (d) None of these

187. $\int e^{2x}\sin 3x\,dx =$ **[Pb. CET 1994]**

(a) $\frac{e^{2x}}{13}(2\sin 3x+3\cos 3x)+c$ (b) $\frac{e^{2x}}{13}(2\sin 3x-3\cos 3x)+c$

(c) $\frac{e^{2x}}{13}(2\cos 3x+3\sin 3x)+c$ (d) $\frac{e^{2x}}{13}(2\cos 3x-3\sin 3x)+c$

188. If $I=\int e^{x}\sin 2x\,dx$, then for what value of K, $KI=e^{x}(\sin 2x-2\cos 2x)+\text{const.}$ **[MP PET 1992]**

(a) 1 (b) 3 (c) 5 (d) 7

189. If $\int g(x)dx=g(x)$, then $\int g(x)\{f(x)+f'(x)\}dx$ is equal to

(a) $g(x)f(x)-g(x)f'(x)+c$ (b) $g(x)f'(x)+c$

(c) $g(x)f(x)+c$ (d) $g(x)f^{2}(x)+c$

190. The primitive of the function $x|\cos x|$ when $\frac{\pi}{2}<x<\pi$ is given by

(a) $\cos x+x\sin x$ (b) $-\cos x-x\sin x$ (c) $x\sin x-\cos x$ (d) None of these

191. $\int \log(x+1)dx =$ **[Roorkee 1974]**

(a) $(x+1)\log(x+1)-x+c$ (b) $(x+1)\log(x+1)+x+c$ (c) $(x-1)\log(x+1)-x+c$ (d) None of these

192. $\int \frac{1}{\log_x e}dx =$ **[MP PET 1994]**

(a) $\log\log_x e+c$ (b) $\frac{1}{(\log_x e)^2}+c$ (c) $x\log\left(\frac{x}{e}\right)+c$ (d) None of these

193. $\int (\log x)^2 dx =$ **[IIT 1971, 77]**

(a) $x(\log x)^2-2x\log x-2x+c$ (b) $x(\log x)^2-2x\log x-x+c$

(c) $x(\log x)^2-2x\log x+2x+c$ (d) $x(\log x)^2-2x\log x+x+c$

194. $\int x\log x dx =$ **[MP PET 1987]**

(a) $\frac{x^2}{2}\log x-\frac{x^2}{2}+c$ (b) $\frac{x^2}{2}\log x-\frac{x^2}{4}+c$ (c) $\frac{x^2}{2}\log x+\frac{x^2}{2}+c$ (d) None of these

195. If $\int \ln(x^2+x)dx=x\ln(x^2+x)+A$, then $A=$ **[MP PET 1992]**

(a) $2x+\ln(x+1)+\text{const.}$ (b) $2x-\ln(x+1)+\text{const.}$ (c) Constant (d) None of these

196. The value of $\int \frac{\log x}{(x+1)^2}dx$ is **[UPSEAT 1999]**

(a) $\frac{-\log x}{x+1}+\log x-\log(x+1)$ (b) $\frac{\log x}{x+1}+\log x-\log(x+1)$

(c) $\frac{\log x}{x+1}-\log x-\log(x+1)$ (d) $\frac{-\log x}{x+1}-\log x-\log(x+1)$

197. $\int \tan^{-1}x dx =$ **[Roorkee 1977]**

(a) $x\tan^{-1}x+\frac{1}{2}\log(1+x^2)$ (b) $x\tan^{-1}x-\frac{1}{2}\log(1+x^2$ (c) $(x-1)\tan^{-1}x$ (d) $x\tan^{-1}x-\log(1+x^2)$

198. $\int x \tan^{-1} x dx =$ **[Roorkee 1979]**

(a) $\frac{1}{2}(x^2+1)\tan^{-1} x - \frac{1}{2}x + c$ (b) $\frac{1}{2}(x^2-1)\tan^{-1} x - \frac{1}{2}x + c$

(c) $\frac{1}{2}(x^2+1)\tan^{-1} x + \frac{1}{2}x + c$ (d) $\frac{1}{2}(x^2+1)\tan^{-1} x - x + c$

199. $\int e^x(1+\tan x)\sec x dx =$

(a) $e^x \cot x$ (b) $e^x \tan x$ (c) $e^x \sec x$ (d) $e^x \cos x$

200. $\int e^x\left[\sin^{-1}\frac{x}{a} + \frac{1}{\sqrt{a^2-x^2}}\right]dx =$

(a) $\frac{1}{a}e^x \sin^{-1}\frac{x}{a} + c$ (b) $ae^x \sin^{-1}\frac{x}{a} + c$ (c) $e^x \sin^{-1}\frac{x}{a} + c$ (d) $\frac{e^x}{\sqrt{a^2-x^2}} + c$

201. $\int e^x \sin x(\sin x + 2\cos x)dx =$ **[MP PET 1988]**

(a) $e^x \sin^2 x + c$ (b) $e^x \sin x + c$ (c) $e^x \sin 2x$ (d) None of these

202. $\int e^x\left(\frac{1}{x} - \frac{1}{x^2}\right)dx =$ **[AISSE 1983; MP PET 1994, 96; MNR 1990]**

(a) $-\frac{e^x}{x^2} + c$ (b) $\frac{e^x}{x^2} + c$ (c) $\frac{e^x}{x} + c$ (d) $-\frac{e^x}{x} + c$

203. $\int e^x[f(x) + f'(x)]dx$ is equal to **[DCE 2002]**

(a) $e^x f(x)$ (b) e^x (c) $e^x f'(x)$ (d) None of these

204. $\int\left(\frac{x+2}{x+4}\right)e^x dx$ is equal to **[AMU 2000]**

(a) $e^x\left(\frac{x}{x+4}\right) + C$ (b) $e^x\left(\frac{x+2}{x+4}\right) + C$ (c) $e^x\left(\frac{x-2}{x+4}\right) + C$ (d) $\left(\frac{2xe^x}{x+4}\right) + C$

205. $\int \frac{x-1}{(x+1)^3}e^x dx =$ **[IIT 1983; MP PET 1990]**

(a) $\frac{-e^x}{(x+1)^2} + c$ (b) $\frac{e^x}{(x+1)^2} + c$ (c) $\frac{e^x}{(x+1)^3} + c$ (d) $\frac{-e^x}{(x+1)^3} + c$

206. $\int \frac{xe^x}{(1+x)^2}dx =$ **[MP PET 1997; UPSEAT 2001; Rajasthan PET 2002]**

(a) $\frac{e^{-x}}{1+x} + C$ (b) $-\frac{e^{-x}}{1+x} + c$ (c) $\frac{e^x}{1+x} + c$ (d) $-\frac{e^x}{1+x} + c$

207. $\int e^x \frac{(x^2+1)}{(x+1)^2}dx =$

(a) $\left(\frac{x-1}{x+1}\right)e^x + c$ (b) $e^x\left(\frac{x+1}{x-1}\right) + c$ (c) $e^x(x+1)(x-1) + c$ (d) None of these

208. The value of $\int e^{2x}(2\sin 3x + 3\cos 3x)dx$ is **[MP PET 2003]**

(a) $e^{2x}\sin 3x$ (b) $e^{2x}\cos 3x$ (c) e^{2x} (d) $e^{2x}(2\sin 3x)$

209. $\int e^x.\left(\frac{1+\sin x}{1+\cos x}\right)dx$ is equal to **[Rajasthan PET 1997; Karnataka CET 2003]**

(a) $e^x.\tan\left(\frac{x}{2}\right)+C$ (b) $e^x.\cot\left(\frac{x}{2}\right)+C$ (c) $e^x.\tan x+C$ (d) $e^x.\cot x+C$

210. $\int e^x.(1+\tan x+\tan^2 x)dx =$ **[Karnataka CET 1999]**

(a) $e^x\sin x+C$ (b) $e^x\cos x+C$ (c) $e^x\tan x+C$ (d) $e^x\sec x+C$

211. $\int (1+x-x^{-1})e^{x+x^{-1}}dx =$ **[EAMCET 2003]**

(a) $(x+1)e^{x+x^{-1}}+C$ (b) $(x-1)e^{x+x^{-1}}+C$ (c) $-xe^{x+x^{-1}}+C$ (d) $xe^{x+x^{-1}}+C$

212. $\int e^{-x}(1-\tan x)\sec x dx$ is equal to

(a) $e^{-x}\sec x+C$ (b) $e^{-x}\tan x+C$ (c) $-e^{-x}\tan x+C$ (d) None of these

213. Let $\int e^x\{f(x)-f'(x)\}dx=\phi(x)$ Then $\int e^x f(x)dx$ is

(a) $\phi(x)+e^x f(x)$ (b) $\phi(x)-e^x f(x)$ (c) $\frac{1}{2}\{\phi(x)+e^x f(x)\}$ (d) $\frac{1}{2}\{\phi(x)+e^x f'(x)\}$

214. If $\int f(x)dx=g(x)$, then $\int f^{-1}(x)dx$ is equal to **[MP PET 2003]**

(a) $g^{-1}(x)$ (b) $xf^{-1}(x)-g(f^{-1}(x))$ (c) $xf^{-1}(x)-g^{-1}(x)$ (d) $f^{-1}(x)$

215. $\int \sin\sqrt{x}dx =$ **[Roorkee 1977]**

(a) $2[\sin\sqrt{x}-\cos\sqrt{x}]+c$ (b) $2[\sin\sqrt{x}-\sqrt{x}\cos\sqrt{x}]+c$ (c) $2[\sin\sqrt{x}+\cos\sqrt{x}]+c$ (d) $2[\sin\sqrt{x}+\sqrt{x}\cos\sqrt{x}]+c$

216. $\int \cos\sqrt{x}dx =$ **[BIT Ranchi 1990; IIT 1997; Rajasthan PET 1999]**

(a) $2[\sqrt{x}\sin\sqrt{x}+\cos\sqrt{x}]+c$ (b) $2[\sqrt{x}\sin\sqrt{x}-\cos\sqrt{x}]+c$ (c) $2[\cos\sqrt{x}-\sqrt{x}\sin\sqrt{x}]+c$ (d) $-2[\sqrt{x}\sin\sqrt{x}+\cos\sqrt{x}]+c$

217. $\int \frac{x\sin^{-1}x}{\sqrt{1-x^2}}dx =$ **[MNR 1978; EAMCET 1982; IIT 1984]**

(a) $x-\sqrt{1-x^2}\sin^{-1}x+c$ (b) $x+\sqrt{1-x^2}\sin^{-1}x+c$ (c) $\sqrt{1-x^2}\sin^{-1}x-x+c$ (d) None of these

218. $\int \frac{x\tan^{-1}x\,dx}{(1+x^2)^{3/2}}$

(a) $\frac{x+\tan^{-1}x}{\sqrt{1+x^2}}+c$ (b) $\frac{x-\tan^{-1}x}{\sqrt{1+x^2}}+c$ (c) $\frac{\tan^{-1}x-x}{\sqrt{1+x^2}}+c$ (d) None of these

Advance Level

219. $\int[\sin(\log x)+\cos(\log x)]dx =$ **[MP PET 1991]**

(a) $x\cos(\log x)+c$ (b) $\sin(\log x)+c$ (c) $\cos(\log x)+c$ (d) $x\sin(\log x)+c$

220. $\int \cos 2\theta \log\left(\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}\right)d\theta =$ **[IIT 1994]**

(a) $(\cos\theta-\sin\theta)^2 \log\left(\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}\right)$ (b) $(\cos\theta+\sin\theta)^2 \log\left(\frac{\cos\theta+\sin\theta}{\cos\theta-\sin\theta}\right)$

(c) $\frac{(\cos\theta-\sin\theta)^2}{2}\log\left(\frac{\cos\theta-\sin\theta}{\cos\theta+\sin\theta}\right)$ (d) $\frac{1}{2}\sin 2\theta \log\tan\left(\frac{\pi}{4}+\theta\right)-\frac{1}{2}\log\sec 2\theta$

221. $\int\left[\log(\log x)+\frac{1}{(\log x)^2}\right]dx =$

(a) $x\log(\log x)+\frac{x}{\log x}+c$ (b) $x\log(\log x)-\frac{x}{\log x}+c$ (c) $x\log(\log x)+\frac{\log x}{x}+c$ (d) $x\log(\log x)-\frac{\log x}{x}+c$

222. If $f(x)=\begin{vmatrix} 0 & x^2-\sin x & \cos x-2 \\ \sin x-x^2 & 0 & 1-2x \\ 2-\cos x & 2x-1 & 0 \end{vmatrix}$, then $\int f(x)dx$ is equal to

(a) $\frac{x^3}{3}-x^2\sin x+\sin 2x$ (b) $\frac{x^3}{3}-x^2\sin x-\cos 2x$ (c) $\frac{x^3}{3}-x^2\cos x+\cos 2x$ (d) Constant

223. If integral of $\frac{2\sin x-\sin 2x}{x^3}$ $(x\neq 0)$ is $g(x)$, then $\lim_{x\to 0} g'(x)$ will be equal to

(a) 1 (b) -1 (c) 0 (d) None of these

224. The value of $\int e^{\sec x}.\sec^3 x(\sin^2 x+\cos x+\sin x+\sin x\cos x)dx$ is

(a) $e^{\sec x}(\sec^2 x+\sec x.\tan x)+c$ (b) $e^{\sec x}+c$

(c) $e^{\sec x}(\sec x+\tan x)+c$ (d) None of these

225. $\int e^{\tan^{-1}x}\left(1+\frac{x}{1+x^2}\right)dx$ is equal to

(a) $x.e^{\tan^{-1}x}$ (b) $\frac{1}{2}xe^{\tan^{-1}x}$ (c) $e^{\tan^{-1}x}$ (d) $\frac{1}{2}e^{\tan^{-1}x}$

226. $\int \sin 2x.\log\cos x dx$ is equal to

(a) $\cos^2 x\left(\frac{1}{2}+\log\cos x\right)+k$ (b) $\cos^2 x.\log x+k$

(c) $\cos^2 x\left(\frac{1}{2}-\log\cos x\right)+k$ (d) None of these

227. If $\int x\log(1+x^2)dx=\phi(x).\log(1+x^2)+\psi(x)+c$ then

(a) $\phi(x)=\frac{1+x^2}{2}$ (b) $\psi(x)=\frac{1+x^2}{2}$ (c) $\psi(x)=-\frac{1+x^2}{2}$ (d) $\phi(x)=-\frac{1+x^2}{2}$

228. If $\int\frac{x\tan^{-1}x}{\sqrt{1+x^2}}dx=\sqrt{1+x^2}f(x)+A\log(x+\sqrt{x^2+1})+c$, then

(a) $f(x)=\tan^{-1}x, A=-1$ (b) $f(x)=\tan^{-1}x, A=1$ (c) $f(x)=2\tan^{-1}x, A=-1$ (d) $f(x)=2\tan^{-1}x, A=1$

229. $\int \frac{\sqrt{x^2+1}[\log(x^2+1)-2\log x]}{x^4}dx$ is equal to

(a) $\frac{1}{3}\left(1+\frac{1}{x^2}\right)^{\frac{1}{2}}\left[\log\left(1+\frac{1}{x^2}\right)+\frac{2}{3}\right]+c$ (b) $-\frac{1}{3}\left(1+\frac{1}{x^2}\right)^{\frac{3}{2}}\left[\log\left(1+\frac{1}{x^2}\right)-\frac{2}{3}\right]+c$

(c) $\frac{2}{3}\left(1+\frac{1}{x^2}\right)^{\frac{3}{2}}\left[\log\left(1+\frac{1}{x^2}\right)+\frac{2}{3}\right]+c$ (d) None of these

230. If $\int x\log(1+\frac{1}{x})dx = f(x).\log(x+1)+g(x).x^2+Ax+c$, then

(a) $f(x)=\frac{1}{2}x^2$ (b) $g(x)=\log x$ (c) $A=1$ (d) None of these

231. If $\int \frac{xe^x}{\sqrt{1+e^x}}dx = f(x)\sqrt{1+e^x}-2\log g(x)+c$, then

(a) $f(x)=x-1$ (b) $g(x)=\frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1}$ (c) $g(x)=\frac{\sqrt{1+e^x}+1}{\sqrt{1+e^x}-1}$ (d) $f(x)=2(x-2)$

232. $\int \frac{\sin^{-1}x}{(1-x^2)^{\frac{3}{2}}}dx =$ **[AISSE 1983, 87]**

(a) $\frac{x}{\sqrt{(1-x^2)}}\sin^{-1}x+\frac{1}{2}\log(1-x^2)+c$ (b) $\frac{x}{\sqrt{(1-x^2)}}\sin^{-1}x-\frac{1}{2}\log(1-x^2)+c$

(c) $\frac{1}{\sqrt{(1-x^2)}}\sin^{-1}x-\frac{1}{2}\log(1-x^2)+c$ (d) $\frac{1}{\sqrt{(1-x^2)}}\sin^{-1}x+\frac{1}{2}\log(1-x^2)+c$

233. If $\int f(x)dx = F(x)$, then $\int x^3 f(x^2)dx$ is equal to

(a) $\frac{1}{2}\left[x^2F(x^2)-\int F(x^2)d(x^2)\right]$ (b) $\frac{1}{2}\left[x^2F(x^2)-\int F(x^2)dx\right]$

(c) $\frac{1}{2}\left[x^2F(x)-\frac{1}{2}\int F(x^2)dx\right]$ (d) None of these

Evaluation of the Various forms of Integrals by use of Standard Results

Basic Level

234. $\int \frac{dx}{x^2+4x+13}$ is equal to **[Kerala CET 2002]**

(a) $\log(x^2+4x+13)+c$ (b) $\frac{1}{3}\tan^{-1}\left(\frac{x+2}{3}\right)+c$ (c) $\log(2x+4)+c$ (d) $\frac{2x+4}{(x^2+4x+13)^2}+c$

235. $\int \frac{dx}{x^2+8x+20} =$ **[Pb. CET 1996]**

(a) $\tan^{-1}\left(\frac{x+4}{2}\right)+c$ (b) $\frac{1}{2}\tan^{-1}\left(\frac{x+4}{2}\right)+c$ (c) $-\tan^{-1}\left(\frac{x+4}{2}\right)+c$ (d) $-\frac{1}{2}\tan^{-1}\left(\frac{x+4}{2}\right)+c$

236. $\int \frac{dx}{1+x-x^2} =$

(a) $\frac{1}{\sqrt{5}}\log\left[\frac{\sqrt{5}-1+2x}{\sqrt{5}+1-2x}\right]+c$ (b) $\frac{1}{\sqrt{5}}\log\left[\frac{\sqrt{5}-1-2x}{\sqrt{5}+1+2x}\right]+c$

(c) $-\frac{1}{\sqrt{5}}\log\left[\frac{\sqrt{5}-1+2x}{\sqrt{5}+1-2x}\right]+c$ (d) $-\frac{1}{\sqrt{5}}\log\left[\frac{\sqrt{5}-1-2x}{\sqrt{5}+1+2x}\right]+c$

237. The value of $\int \frac{dx}{3-2x-x^2}$ will be **[UPSEAT 1999]**

(a) $\frac{1}{4}\log\left(\frac{3+x}{1-x}\right)$ (b) $\frac{1}{3}\log\left(\frac{3+x}{1-x}\right)$ (c) $\frac{1}{2}\log\left(\frac{3+x}{1-x}\right)$ (d) $\log\left(\frac{1-x}{3+x}\right)$

238. If $\int \frac{2x+3}{x^2-5x+6}\,dx = 9\ln(x-3)-7\ln(x-2)+A$, then $A =$

(a) $5\ln(x-2)+\text{constant}$ (b) $-4\ln(x-3)+\text{constant}$ (c) Constant (d) None of these

239. $\int \frac{x\,dx}{x^2+4x+5}$ **[Rajasthan PET 2002]**

(a) $\frac{1}{2}\log(x^2+4x+5)+2\tan^{-1}x+c$ (b) $\frac{1}{2}\log(x^2+4x+5)-\tan^{-1}(x+2)+c$

(c) $\frac{1}{2}\log(x^2+4x+5)+\tan^{-1}(x+2)+c$ (d) $\frac{1}{2}\log(x^2+4x+5)-2\tan^{-1}(x+2)+c$

240. $\int \frac{2x-3}{x^2+3x-18}dx =$

(a) $\log|x^2+3x-18|-\frac{2}{3}\log\left|\frac{x-3}{x+6}\right|+c$ (b) $\log|x^2+3x-18|+\frac{2}{3}\log\left|\frac{x-3}{x+6}\right|+c$

(c) $-\log|x^2+3x-18|-\frac{2}{3}\log\left|\frac{x-3}{x+6}\right|+c$ (d) $-\log|x^2+3x-18|+\frac{2}{3}\log\left|\frac{x-3}{x+6}\right|+c$

241. $\int \sqrt{x^2-8x+7}\,dx =$

(a) $\frac{1}{2}(x-4)\sqrt{x^2-8x+7}+9\log[x-4+\sqrt{x^2-8x+7}]+c$ (b) $\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-3\sqrt{2}\log[x-4+\sqrt{x^2-8x+7}]+c$

(c) $\frac{1}{2}(x-4)\sqrt{x^2-8x+7}-\frac{9}{2}\log[x-4+\sqrt{x^2-8x+7}]+c$ (d) None of these

242. $\int \frac{dx}{\sqrt{2x-x^2}} =$ **[MP PET 1991; Karnataka CET 2002]**

(a) $\cos^{-1}(x-1)+c$ (b) $\sin^{-1}(x-1)+c$ (c) $\cos^{-1}(1+x)+c$ (d) $\sin^{-1}(1-x)+c$

243. $\int \frac{x^4+x^2+1}{x^2-x+1}dx =$

(a) $\frac{1}{3}x^3+\frac{1}{2}x^2+x+c$ (b) $\frac{1}{3}x^3-\frac{1}{2}x^2+x+c$ (c) $\frac{1}{3}x^3+\frac{1}{2}x^2-x+c$ (d) None of these

244. $\int \frac{dx}{x[(\log x)^2 + 4\log x - 1]} =$

(a) $\frac{1}{2\sqrt{5}} \log\left[\frac{\log x + 2 - \sqrt{5}}{\log x + 2 + \sqrt{5}}\right] + c$ (b) $\frac{1}{\sqrt{5}} \log\left[\frac{\log x + 2 - \sqrt{5}}{\log x + 2 + \sqrt{5}}\right] + c$

(c) $\frac{1}{2\sqrt{5}} \log\left[\frac{\log x + 2 + \sqrt{5}}{\log x + 2 - \sqrt{5}}\right] + c$ (d) $\frac{1}{\sqrt{5}} \log\left[\frac{\log x + 2 + \sqrt{5}}{\log x + 2 - \sqrt{5}}\right] + c$

245. $\int \frac{dx}{7 + 5\cos x} =$ **[EAMCET 2002]**

(a) $\frac{1}{\sqrt{6}} \tan^{-1}\left(\frac{1}{\sqrt{6}} \tan\frac{x}{2}\right) + c$ (b) $\frac{1}{\sqrt{3}} \tan^{-1}\left(\frac{1}{\sqrt{3}} \tan\frac{x}{2}\right) + c$

(c) $\frac{1}{4} \tan^{-1}\left(\tan\frac{x}{2}\right) + c$ (d) $\frac{1}{7} \tan^{-1}\left(\tan\frac{x}{2}\right) + c$

246. $\int \frac{dx}{\sin x + \sqrt{3}\cos x} =$

(a) $\log \tan\left(\frac{x}{2} + \frac{\pi}{2}\right) + c$ (b) $\frac{1}{2}\log \tan\left(\frac{x}{2} + \frac{\pi}{6}\right) + c$ (c) $\log \cot\left(\frac{x}{2} + \frac{\pi}{6}\right) + c$ (d) $\frac{1}{2}\log \cot\left(\frac{x}{2} + \frac{\pi}{6}\right) + c$

247. $\int \frac{dx}{1 - \sin x + \cos x} =$ **[Pb. CET 1992]**

(a) $\log\left|1 - \tan\frac{x}{2}\right| + c$ (b) $-\log\left|1 - \tan\frac{x}{2}\right| + c$ (c) $\log\left|1 + \tan\frac{x}{2}\right| + c$ (d) None of these

248. $\int \frac{dx}{\sin x - \cos x + \sqrt{2}}$ equals **[MP PET 2002]**

(a) $-\frac{1}{\sqrt{2}} \tan\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ (b) $\frac{1}{\sqrt{2}} \tan\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ (c) $\frac{1}{\sqrt{2}} \cot\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$ (d) $-\frac{1}{\sqrt{2}} \cot\left(\frac{x}{2} + \frac{\pi}{8}\right) + c$

249. $\int \frac{dx}{1 + 2\sin x + \cos x} =$ **[Rajasthan PET 1991]**

(a) $\log[1 + 2\tan(x/2)] + c$ (c) $\log[1 - 2\tan(x/2)] + c$ (c) $\frac{1}{2}\log[1 + 2\tan(x/2)] + c$ (d) None of these

250. $\int \frac{c^2 \sin 2x}{a^2 + b^2 \sin^2 x} dx =$

(a) $\frac{c^2}{b^2}\log(a^2 + b^2\sin^2 x) + k$ (b) $\frac{c^2}{a^2}\log(a^2 + b^2\sin^2 x) + k$ (c) $\frac{b^2}{c^2}\log(a^2 + b^2\sin^2 x) + k$ (d) None of these

251. $\int \frac{1}{1 + \sin^2 x} dx =$

(a) $\frac{1}{\sqrt{2}} \tan^{-1}(\sqrt{2}\tan x) + k$ (b) $\sqrt{2}\tan^{-1}(\sqrt{2}\tan x) + k$ (c) $-\frac{1}{\sqrt{2}} \tan^{-1}(\sqrt{2}\tan x) + k$ (d) $-\sqrt{2}\tan^{-1}(\sqrt{2}\tan x) + k$

252. $\int \frac{1}{1 + \cos^2 x} dx =$

(a) $\frac{1}{\sqrt{2}} \tan^{-1}(\tan x) + c$ (b) $\frac{1}{\sqrt{2}} \tan^{-1}\left(\frac{1}{2}\tan x\right) + c$ (c) $\frac{1}{\sqrt{2}} \tan^{-1}\left(\frac{1}{\sqrt{2}}\tan x\right) + c$ (d) None of these

253. $\int \frac{dx}{(a\sin x + b\cos x)^2} =$

(a) $\frac{1}{a(a\tan x + b)} + c$ (b) $\frac{-1}{a(a\tan x + b)} + c$ (c) $\frac{1}{a\tan x + b} + c$ (d) $\frac{-1}{a\tan x + b} + c$

254. $\int \frac{2\sin x + 3\cos x}{4\sin x + 5\cos x} dx$

(a) $\frac{2}{41}\log|5\cos x + 4\sin x| + \frac{23}{41}x + c$ (b) $\frac{1}{2}\log|\sin x - \cos x| + \frac{1}{2}x + c$

(c) $\frac{2}{13}\log|2\sin x + 3\cos x| + \frac{3}{13}x + c$ (d) $\frac{1}{2}\log|\sin x + \cos x| + \frac{1}{2}x + c$

255. $\int \frac{dx}{1-\tan x} =$ **[Pb. CET 1991, 93]**

(a) $\frac{1}{2}x - \frac{1}{2}\log|\cos x - \sin x| + c$ (b) $\frac{1}{2}x + \frac{1}{2}\log|\cos x + \sin x| + c$

(c) $\frac{1}{2}x + \frac{1}{2}\log|\cos x - \sin x| + c$ (d) None of these

256. $\int \frac{dx}{\cos x - \sin x}$ is equal to **[AIEEE 2004]**

(a) $\frac{1}{\sqrt{2}}\log\left|\tan\left(\frac{x}{2} + \frac{3\pi}{8}\right)\right| + c$ (b) $\frac{1}{\sqrt{2}}\log\left|\cot\left(\frac{x}{2}\right)\right| + c$ (c) $\frac{1}{\sqrt{2}}\log\left|\tan\left(\frac{x}{2} - \frac{3\pi}{8}\right)\right| + c$ (d) $\frac{1}{\sqrt{2}}\log\left|\tan\left(\frac{x}{2} - \frac{\pi}{8}\right)\right| + c$

257. $\int \frac{3\sin x + 2\cos x}{3\cos x + 2\sin x} dx =$

(a) $\frac{12}{13}x - \frac{5}{13}\log(3\cos x + 2\sin x)$ (b) $\frac{12}{13}x + \frac{5}{13}\log(3\cos x + 2\sin x$

(c) $\frac{13}{12}x + \frac{5}{13}\log(3\cos x + 2\sin x$ (d) None of these

258. $\int \frac{6x+7}{\sqrt{(x-5)(x-4)}} dx =$

(a) $6\sqrt{x^2-9x+20} + 34\log\left|x - \frac{9}{2} + \sqrt{x^2-9x+20}\right| + c$ (b) $6\sqrt{x^2+9x+20} + 34\log\left|x - \frac{9}{2} + \sqrt{x^2+9x+20}\right| + c$

(c) $6\sqrt{x^2-9x+20} - 34\log\left|x - \frac{9}{2} + \sqrt{x^2-9x+20}\right| + c$ (d) $6\sqrt{x^2+9x+20} - 34\log\left|x - \frac{9}{2} + \sqrt{x^2+9x+20}\right| + c$

Advance Level

259. The integral $\int \frac{2x-3}{(x^2+x+1)^2} dx$ is equal to

(a) $-\frac{8x+7}{3(x^2+x+1)} - \frac{16}{3\sqrt{3}}\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right) + c$ (b) $-\frac{1}{x^2+x+1} - \frac{4}{3}\tan^{-1}(4x+3) + c$

(c) $\frac{1}{2(x^2+x+1)} - \frac{(2x+1)^2}{(x^2+x+1)^2} + c$ (d) $\frac{1}{4(x^2+x+1)} + \frac{2}{3}\tan^{-1}(2x+1) + c$

260. The value of the integral $\int \frac{1+x^2}{1+x^4} dx$ is equal to

(a) $\tan^{-1} x^2 + c$ (b) $\frac{1}{\sqrt{2}} \tan^{-1}\left(\frac{x^2-1}{\sqrt{2}x}\right)$ (c) $\frac{1}{2\sqrt{2}} \log\left(\frac{x^2+\sqrt{2}x+1}{x^2-\sqrt{2}x+1}\right)+c$ (d) None of these

261. $\int \frac{x+2}{(x^2+3x+3)\sqrt{x+1}}\,dx$ is equal to

(a) $\frac{1}{\sqrt{3}} \tan^{-1}\left(\frac{x}{\sqrt{3(x+1)}}\right)$ (b) $\frac{2}{\sqrt{3}} \tan^{-1}\left(\frac{x}{\sqrt{3(x+1)}}\right)$ (c) $\frac{2}{\sqrt{3}} \tan^{-1}\left(\frac{x}{\sqrt{x+1}}\right)$ (d) None of these

262. $\int \frac{dx}{(1+x^2)\sqrt{1-x^2}} =$ **[MNR 1985]**

(a) $\frac{1}{\sqrt{2}} \tan^{-1}\left[\frac{\sqrt{1-x^2}}{x\sqrt{2}}\right]+c$ (b) $\frac{1}{\sqrt{2}} \tan^{-1}\left[\frac{x\sqrt{2}}{\sqrt{1-x^2}}\right]+c$ (c) $\sqrt{2} \tan^{-1}\left[\frac{\sqrt{1-x^2}}{x\sqrt{2}}\right]+c$ (d) $-\sqrt{2} \tan^{-1}\left[\frac{\sqrt{1-x^2}}{x\sqrt{2}}\right]+c$

Integration of Rational functions by using Partial fractions

Basic Level

263. Correct evaluation of $\int \frac{x}{(x-2)(x-1)}\,dx$ is **[MP PET 1993]**

(a) $\log_e \frac{(x-2)^2}{(x-1)}+p$ (b) $\log_e \frac{(x-1)}{(x-2)}+p$ (c) $\frac{x-1}{x-2}+p$ (d) $2\log_e \frac{(x-2)}{(x-1)}+p$

(where p is an aribitrary constant)

264. $\int \frac{dx}{(x+1)(x+2)} =$ **[MP PET 1987]**

(a) $\log \frac{(x+2)}{(x+1)}+c$ (b) $\log(x+1)+\log(x+2)+c$ (c) $\log \frac{(x+1)}{(x+2)}+c$ (d) None of these

265. $\int \frac{dx}{1-x^2} =$ **[MP PET 1987, 92, 2000]**

(a) $\tan^{-1} x + c$ (b) $\sin^{-1} x + c$ (c) $\frac{1}{2}\log\left|\frac{1+x}{1-x}\right|+c$ (d) $\frac{1}{2}\log\left|\frac{1-x}{1+x}\right|+c$

266. $\int \frac{x-1}{(x-3)(x-2)}\,dx =$ **[Roorkee 1978]**

(a) $\log(x-3)-\log(x-2)+c$ (b) $\log(x-3)^2-\log(x-2)+c$ (c) $\log(x-3)+\log(x-2)+c$ (d) $\log(x-3)^2+\log(x-2)+c$

267. $\int \frac{1}{x-x^3}\,dx =$ **[MP PET 1996]**

(a) $\frac{1}{2}\log\frac{(1-x^2)}{x^2}+c$ (b) $\log\frac{(1-x)}{x(1+x)}+c$ (c) $\log x(1-x^2)+c$ (d) $\frac{1}{2}\log\frac{x^2}{(1-x^2)}+c$

268. If $\int \frac{1}{(\sin x+4)(\sin x-1)}\,dx = A\frac{1}{\tan\frac{x}{2}-1}+B\tan^{-1} f(x)+c$, then

(a) $A=\frac{1}{5}$, $B=\frac{-2}{5\sqrt{15}}$, $f(x)=\frac{4\tan x+3}{\sqrt{15}}$ (b) $A=-\frac{1}{5}$, $B=\frac{1}{\sqrt{15}}$, $f(x)=\frac{4\tan\left(\frac{x}{2}\right)+1}{\sqrt{15}}$

(c) $A=\frac{2}{5},\ B=\frac{-2}{5},\ f(x)=\frac{4\tan x+1}{5}$ (d) $A=\frac{2}{5},\ B=\frac{-2}{5\sqrt{15}},\ f(x)=\frac{4\tan\frac{x}{2}+1}{\sqrt{15}}$

269. $\int \frac{dx}{(\sin x-2\cos x)(2\sin x+\cos x)}=$

(a) $\frac{1}{5}\log\left|\frac{\tan x-2}{1+2\tan x}\right|+c$ (b) $-\frac{1}{5}\log\left|\frac{\tan x-2}{1+2\tan x}\right|+c$ (c) $\log\left|\frac{\tan x-2}{1+2\tan x}\right|+c$ (d) $-\log\left|\frac{\tan x-2}{1+2\tan x}\right|+c$

270. $\int \frac{dx}{(x-1)^2(x-2)}=$ **[CBSE PMT 1994]**

(a) $\log\left|\frac{x-2}{x-1}\right|+\frac{1}{x-1}+c$ (b) $\log\left|\frac{x-1}{x-2}\right|+\frac{1}{x-1}+c$ (c) $\log\left|\frac{x-2}{x-1}\right|-\frac{1}{x-1}+c$ (d) $\log\left|\frac{x-1}{x-2}\right|-\frac{1}{x-1}+c$

271. $\int \frac{x-1}{(x+1)^2}dx=$

(a) $\log(x+1)+\frac{2}{x+1}+c$ (b) $\log(x+1)-\frac{2}{x+1}+c$ (c) $\frac{2}{x+1}-\log(x+1)+c$ (d) None of these

272. $\int \frac{2x}{(2x+1)^2}dx=$ **[DSSE 1985]**

(a) $\frac{1}{2}\log(2x+1)+\frac{1}{2(2x+1)}+c$ (b) $\frac{1}{2}\log(2x+1)-\frac{1}{2(2x+1)}+c$

(c) $2\log(2x+1)+\frac{1}{2(2x+1)}+c$ (d) $2\log(2x+1)-\frac{1}{2(2x+1)}+c$

273. $\int \frac{dx}{(x-x^2)}=$ **[Roorkee 1982]**

(a) $\log x-\log(1-x)+c$ (b) $\log(1-x)^2+c$ (c) $-\log x+\log(1-x)+c$ (d) $\log(x-x^2)+c$

274. Value of $\int \frac{x^2}{x^2-a^2}dx=$ **[MNR 1997]**

(a) $x-\frac{a}{2}\log\left(\frac{x-a}{x+a}\right)+c$ (b) $x+\frac{a}{2}\log\left(\frac{x-a}{x+a}\right)+c$ (c) $x-\frac{a}{2}\log\left(\frac{x+a}{x-a}\right)+c$ (d) $x+\frac{a}{2}\log\left(\frac{x+a}{x-a}\right)+c$

275. $\int \frac{1}{(x-1)(x^2+1)}dx=$ **[Roorkee 1984]**

(a) $\frac{1}{2}\log(x-1)-\frac{1}{4}\log(x^2+1)-\frac{1}{2}\tan^{-1}x+c$ (b) $\frac{1}{2}\log(x-1)+\frac{1}{4}\log(x^2+1)-\frac{1}{2}\tan^{-1}x+c$

(c) $\frac{1}{2}\log(x-1)-\frac{1}{2}\log(x^2+1)-\frac{1}{2}\tan^{-1}x+c$ (d) None of these

276. If $\int \frac{2x+3}{(x-1)(x^2+1)}dx=\log_e\left\{(x-1)^{\frac{5}{2}}(x^2+1)^a\right\}-\frac{1}{2}\tan^{-1}x+A$, Where A is any arbitrary constant, then the value of 'a' is **[MP PET 1998]**

(a) $\frac{5}{4}$ (b) $-\frac{5}{3}$ (c) $-\frac{5}{6}$ (d) $-\frac{5}{4}$

277. $\int \frac{dx}{(x^2+1)(x^2+4)}=$ **[MP PET 1995]**

(a) $\frac{1}{3}\tan^{-1}x-\frac{1}{3}\tan^{-1}\frac{x}{2}+c$ (b) $\frac{1}{3}\tan^{-1}x+\frac{1}{3}\tan^{-1}\frac{x}{2}+c$

(c) $\frac{1}{3}\tan^{-1}x-\frac{1}{6}\tan^{-1}\frac{x}{2}+c$ (d) $\tan^{-1}x-2\tan^{-1}\frac{x}{2}+c$

278. $\int \frac{x^2}{(x^2+2)(x^2+3)}dx=$ **[AISSE 1990]**

(a) $-\sqrt{2}\tan^{-1}x+\sqrt{3}\tan^{-1}x+c$ (b) $-\sqrt{2}\tan^{-1}\frac{x}{\sqrt{2}}+\sqrt{3}\tan^{-1}\frac{x}{\sqrt{3}}+c$

(c) $\sqrt{2}\tan^{-1}\frac{x}{\sqrt{2}}+\sqrt{3}\tan^{-1}\frac{x}{\sqrt{3}}+c$ (d) None of these

279. $\int \frac{1}{(x^2+a^2)(x^2+b^2)}dx=$

(a) $\frac{1}{(a^2-b^2)}\left[\frac{1}{b}\tan^{-1}\left(\frac{x}{b}\right)-\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)\right]+c$ (b) $\frac{1}{(b^2-a^2)}\left[\frac{1}{b}\tan^{-1}\left(\frac{x}{b}\right)-\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)\right]+c$

(c) $\frac{1}{b}\tan^{-1}\left(\frac{x}{b}\right)-\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)+c$ (d) $\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)-\frac{1}{b}\tan^{-1}\left(\frac{x}{b}\right)+c$

280. $\int \frac{x\,dx}{(x^2-a^2)(x^2-b^2)}=$ **[Roorkee 1976]**

(a) $\frac{1}{(a^2-b^2)}\log\left(\frac{x^2-a^2}{x^2-b^2}\right)+c$ (b) $\frac{1}{a^2-b^2}\log\left(\frac{x^2-b^2}{x^2-a^2}\right)+c$

(c) $\frac{1}{2(a^2-b^2)}\log\left(\frac{x^2-a^2}{x^2-b^2}\right)+c$ (d) $\frac{1}{2(a^2-b^2)}\log\left(\frac{x^2-b^2}{x^2-a^2}\right)+c$

281. If $\int\frac{(2x^2+1)dx}{(x^2-4)(x^2-1)}=\log\left[\left(\frac{x+1}{x-1}\right)^a\left(\frac{x-2}{x+2}\right)\right]+c$, then the values of a and b are respectively **[Roorkee 2000]**

(a) $\frac{1}{2},\frac{3}{4}$ (b) $-1,\frac{3}{2}$ (c) $1,\frac{3}{2}$ (d) $\frac{-1}{2},\frac{3}{4}$

282. If $\int\frac{2x^2+3}{(x^2-1)(x^2+4)}dx=a\log\left(\frac{x-1}{x+2}\right)+b\tan^{-1}\left(\frac{x}{2}\right)+c$, then values of a and b are **[Rajasthan PET 2000]**

(a) $(1,-1)$ (b) $(-1,1)$ (c) $\left(\frac{1}{2},-\frac{1}{2}\right)$ (d) $\left(\frac{1}{2},\frac{1}{2}\right)$

283. For $x>1$, $\int\frac{1}{x(x^4-1)}dx=$ **[Rajasthan PET 1997, 89]**

(a) $\log\frac{x^4-1}{x^4}+k$ (b) $\frac{1}{4}\log\frac{x^4-1}{x^4}+k$ (c) $\log\frac{x^4-1}{x}+k$ (d) $\frac{1}{4}\log\frac{x^4-1}{x}+k$

284. $\int\frac{dx}{e^x+1-2e^x}=$

(a) $\log(e^x-1)-\log(e^x+2)+c$ (b) $\frac{1}{2}\log(e^x-1)-\frac{1}{3}\log(e^x+2)+c$

(c) $\frac{1}{3}\log(e^x-1)-\frac{1}{3}\log(e^x+2)+c$ (d) $\frac{1}{3}\log(e^x-1)+\frac{1}{3}\log(e^x+2)+c$

285. $\int\frac{x^2}{x^2+6x-3}dx=$ **[AICBSE 1999]**

(a) $x+3\log\left|x^2+6x-3\right|+\frac{21}{4\sqrt{3}}\log\left|\frac{x+3-2\sqrt{3}}{x+3+2\sqrt{3}}\right|+c$ (b) $x-3\log\left|x^2+6x-3\right|+\frac{21}{4\sqrt{3}}\log\left|\frac{x+3-2\sqrt{3}}{x+3+2\sqrt{3}}\right|+c$

(c) $x-3\log\left|x^2+6x-3\right|-\frac{21}{4\sqrt{3}}\log\left|\frac{x+3-2\sqrt{3}}{x+3+2\sqrt{3}}\right|+c$ (d) None of these

286. $\int \frac{e^x}{(1+e^x)(2+e^x)}dx =$

(a) $\log[(1+e^x)(2+e^x)]+c$ (b) $\log\left[\frac{1+e^x}{2+e^x}\right]+c$ (c) $\log[(1+e^x)\sqrt{2+e^x}]+c$ (d) None of these

Advance Level

287. $\int \frac{x^3-x-2}{(1-x^2)}dx =$ **[AICBSE 1985]**

(a) $\log\left(\frac{x+1}{x-1}\right)-\frac{x^2}{2}+c$ (b) $\log\left(\frac{x-1}{x+1}\right)+\frac{x^2}{2}+c$ (c) $\log\left(\frac{x+1}{x-1}\right)+\frac{x^2}{2}+c$ (d) $\log\left(\frac{x-1}{x+1}\right)-\frac{x^2}{2}+c$

288. $\int \frac{x^2+x-1}{x^2+x-6}dx =$ **[AISSE 1988]**

(a) $x+\log(x+3)+\log(x-2)+c$ (b) $x-\log(x+3)+\log(x-2)+c$

(c) $x-\log(x+3)-\log(x-2)+c$ (d) None of these

289. $\int \frac{dx}{1+x+x^2+x^3} =$ **[MP PET 1991]**

(a) $\log\sqrt{1+x}-\frac{1}{2}\log\sqrt{1+x^2}+\frac{1}{2}\tan^{-1}x+c$ (b) $\log\sqrt{1+x}-\log\sqrt{1+x^2}+\tan^{-1}x+c$

(c) $\log\sqrt{1+x^2}-\log\sqrt{1+x}+\frac{1}{2}\tan^{-1}x+c$ (d) $\log\sqrt{1+x}+\tan^{-1}x+\log\sqrt{1+x^2}+c$

290. $\int \frac{x^3-1}{x^3+x}dx =$ **[Roorkee 1988, MP PET 2001]**

(a) $x-\log x+\frac{1}{2}\log(x^2+1)+\tan^{-1}x+c$ (b) $x-\log x+\log\sqrt{x^2+1}-\tan^{-1}x+c$

(c) $x+\log x+\log\sqrt{x^2+1}+\tan^{-1}x+c$ (d) None of these

291. $\int \frac{(1+x)^3}{(1-x)^3}dx =$

(a) $x+6\log|1-x|+\frac{12}{1-x}-\frac{4}{(1-x)^2}+c$ (b) $-x+6\log|1-x|+\frac{12}{1-x}-\frac{4}{(1-x)^2}+c$

(c) $-x-6\log|1-x|-\frac{12}{1-x}-\frac{4}{(1-x)^2}+c$ (d) None of these

292. $\int \frac{dx}{x(x^5+1)} =$ **[CBSE 1997]**

(a) $\frac{1}{5}\log\left|\frac{x^5}{x^5+1}\right|+c$ (b) $5\log\left|\frac{x^5}{x^5+1}\right|+c$ (c) $-\frac{1}{5}\log\left|\frac{x^5}{x^5+1}\right|+c$ (d) $-5\log\left|\frac{x^5}{x^5+1}\right|+c$

293. If $\int \frac{4e^x+6e^{-x}}{9e^x-4e^{-x}}dx = Ax+B\log(9e^{2x}-4)+C$ then A, B and C are **[IIT 1990]**

(a) $A=\frac{3}{2},\quad B=\frac{36}{35},\quad C=\frac{3}{2}\log 3+$ constant

(b) $A=\frac{3}{2},\quad B=\frac{35}{36},\quad C=\frac{3}{2}\log 3+$ constant

(c) $A=-\frac{3}{2},\quad B=-\frac{35}{36},\quad C=-\frac{3}{2}\log 3+$ constant

(d) None of these

294. $\int \frac{x}{x^4-1}dx=$

(a) $\frac{1}{4}\log\left[\frac{x^2-1}{x^2+1}\right]+c$ (b) $\frac{1}{4}\log\left[\frac{x^2+1}{x^2-1}\right]+c$ (c) $\frac{1}{2}\log\left[\frac{x^2-1}{x^2+1}\right]+c$ (d) $\frac{1}{2}\log\left[\frac{x^2+1}{x^2-1}\right]+c$

295. $\int \frac{dx}{\sin x+\sin 2x}=$ **[IIT 1984; J & KCET 1995]**

(a) $\frac{1}{6}\log(1-\cos x)+\frac{1}{2}\log(1+\cos x)-\frac{2}{3}\log(1+2\cos x)+c$

(b) $6\log(1-\cos x)+2\log(1+\cos x)-\frac{2}{3}\log(1+2\cos x)+c$

(c) $6\log(1-\cos x)+\frac{1}{2}\log(1+\cos x)+\frac{2}{3}\log(1+2\cos x)+c$

(d) None of these

296. The value of $\int \frac{\cos^3 x+\cos^5 x}{\sin^2 x+\sin^4 x}dx$ is

(a) $\sin x-6\tan^{-1}(\sin x)+c$

(b) $\sin x-2(\sin x)^{-1}+c$

(c) $\sin x-2(\sin x)^{-1}-6\tan^{-1}(\sin x)+c$

(d) $\sin x-2(\sin x)^{-1}+5\tan^{-1}(\sin x)+c$

Reduction formulae for some Special cases, Integration of form $\int \sin^m x\cos^n x\,dx, \int \sin mx\cos nx\,dx, \int \sin mx\sin nx\,dx, \int \cos mx\cos nx\,dx$

Basic Level

297. $\int \tan^4 x\,dx=$

(a) $\tan^3 x-\tan x+x+c$ (b) $\frac{1}{3}\tan^3 x-\tan x+x+c$ (c) $\frac{1}{3}\tan^3 x+\tan x+x+c$ (d) $\frac{1}{3}\tan^3 x+\tan x+2x+c$

298. The value of $\int \sec^3 x\,dx$ will be **[UPSEAT 1999]**

(a) $\frac{1}{2}[\sec x\tan x+\log(\sec x+\tan x)]$

(b) $\frac{1}{3}[\sec x\tan x+\log(\sec x+\tan x)]$

(c) $\frac{1}{4}[\sec x\tan x+\log(\sec x+\tan x)]$

(d) $\frac{1}{8}[\sec x\tan x+\log(\sec x+\tan x)]$

299. $\int \sec^{2/3} x.\operatorname{cosec}^{4/3} x\,dx=$

(a) $-3(\tan x)^{1/3}+c$ (b) $-3(\tan x)^{-1/3}+c$ (c) $3(\tan x)^{-1/3}+c$ (d) $(\tan x)^{-1/3}+c$

300. $\int \sin^4 x\cos^3 x\,dx=$ **[CBSE 1985]**

(a) $\frac{1}{5}\sin^5 x+\frac{1}{7}\sin^7 x+c$ (b) $\frac{1}{5}\sin^5 x-\frac{1}{7}\sin^7 x+c$ (c) $-\frac{1}{5}\sin^5 x+\frac{1}{7}\sin^7 x+c$ (d) None of these

301. $\int \sin^3 x dx$ is equal to **[SCRA 1996]**

(a) $\sin^2 x+1$ (b) $\sin x^2+x^2+1$ (c) $\frac{\cos^3 x}{3}-\cos x$ (d) $\frac{1}{4}\sin^4 x-\frac{3}{4}\sin^2 x$

302. Which value of constant not integration makes the value of integral of $\sin 3x.\cos 5x$ equal to zero at $x=0$ **[Roorkee 1971]**

(a) 0 (b) –3/16 (c) –5/6 (d) 1/8

303. $\int \sin 2x.\sin 3x\,dx$ equals **[Rajasthan PET 1989]**

(a) $\frac{(\sin x - \sin 5x)}{2} + c$ (b) $\frac{(\sin x - \sin 5x)}{10} + c$ (c) $\frac{(5\sin x - \sin 5x)}{10} + c$ (d) None of these.

304. $\int \cos 2x . \sin 4x dx$ equals

(a) $\frac{\cos 2x}{2} + \frac{\cos 6x}{6} + c$ (b) $-\left(\frac{\cos 2x}{2} + \frac{\cos 6x}{6}\right) + c$ (c) $-\left(\frac{\cos 2x}{4} + \frac{\cos 6x}{12}\right) + c$ (d) None of these.

305. $\int \frac{\sin 5x}{\cos 7x . \cos 2x} dx$ is equal to

(a) $\log|\sec 7x| + c$ (b) $\log|\sec 7x . \sec 2x| + c$ (c) $\log|\sec 7x + \sec 2x| + c$ (d) None of these

306. $\int \cos^5 x\, dx =$

(a) $\sin x - \frac{2}{3}\sin^3 x + \frac{1}{5}\sin^5 x + c$ (b) $\sin x + \frac{2}{3}\sin^3 x + \frac{1}{5}\sin^5 x + c$

(c) $\sin x - \frac{2}{3}\sin^3 x - \frac{1}{5}\sin^5 x + c$ (d) None of these

Advance Level

307. If $f(x) = \int \cot^4 x dx + \frac{1}{3}\cot^3 x - \cot x$ and $f\left(\frac{\pi}{2}\right) = \frac{\pi}{2}$ then $f(x) =$

(a) $\frac{\pi}{2} - x$ (b) $x - \pi$ (c) $\pi - x$ (d) x

Integration of Hyperbolic Functions

Basic Level

308. $\int \frac{dx}{1 + \cosh x} =$

(a) $\cot h\left(\frac{x}{2}\right) + c$ (b) $\tan h\left(\frac{x}{2}\right) + c$ (c) $\frac{1}{2}\tan h\left(\frac{x}{2}\right) + c$ (d) None of these

309. $\int \frac{dx}{x\sqrt{(\log x)^2 - 3}}$ is equal to

(a) $\sin h^{-1}\left(\log \frac{x}{\sqrt{3}}\right) + c$ (b) $\cos h^{-1}\left(\log \frac{x}{\sqrt{3}}\right) + c$ (c) $\cos h^{-1}\left(\log \frac{x}{\sqrt{2}}\right) + c$ (d) None of these

310. $\int \frac{(e^x + e^{-x})^2}{(e^x - e^{-x})^2} dx$ is equal to

(a) $2\log(e^x - e^{-x}) + c$ (b) $2\log(e^x + e^{-x}) + c$ (c) $x + \cot hx + c$ (d) $x - \cot hx + c$

311. $\int \frac{1}{x}\sqrt{\frac{x-1}{x+1}} dx$ equals

(a) $\cos h^{-1} x + \sec^{-1} x + c$ (b) $\sin h^{-1} x - \sec^{-1} x + c$ (c) $\cos h^{-1} x - \sec^{-1} x + c$ (d) $\sin h^{-1} x + \sec^{-1} x + c$

312. $\int \sqrt{\sec x - 1}\,dx$ is equal to

(a) $2\sin h^{-1}\left\{\sqrt{2}\cos\left(\frac{x}{2}\right)\right\}+c$ (b) $-2\sin h^{-1}\left\{\sqrt{2}\cos\left(\frac{x}{2}\right)\right\}+c$ (c) $-2\cos h^{-1}\left\{\sqrt{2}\cos\left(\frac{x}{2}\right)\right\}+c$ (d) None of these

313. $\int e^x(\sin hx + \cos hx)\,dx$ is equal to **[Karnataka CET 1993]**

(a) $e^x \sec hx + c$ (b) $e^x \cos hx + c$ (c) $\sin h\,2x + c$ (d) $\cos h\,2x + c$

Integration of Surds like Expression

Basic Level

314. $\int \frac{x^{5/2}}{\sqrt{1+x^7}}dx$ is

(a) $\frac{2}{7}\log(x^{7/2}+\sqrt{x^7+1})+c$ (b) $\frac{1}{2}\log\frac{x^7+1}{x^7-1}+c$ (c) $2\sqrt{1+x^7}+c$ (d) None of these

315. $\int \frac{dx}{x^{1/5}(1+x^{4/5})^{1/2}}$ is

(a) $\sqrt{1+x^{4/5}}+k$ (b) $\frac{5}{2}\sqrt{1+x^{4/5}}+k$ (c) $x^{4/5}(1+x^{4/5})^{1/2}+k$ (d) None of these

316. $\int x^{-\frac{2}{3}}(1+x^{\frac{1}{2}})^{-\frac{5}{3}}dx$ is equal to

(a) $3(1+x^{-1/2})^{-1/3}+c$ (b) $3(1+x^{-1/2})^{-2/3}+c$ (c) $3(1+x^{1/2})^{-2/3}+c$ (d) None of these

317. The value of $\int \frac{(x-x^3)^{1/3}}{x^4}dx$ is

(a) $\frac{3}{8}\left(\frac{1}{x^2}-1\right)^{\frac{4}{3}}+c$ (b) $-\frac{3}{8}\left(\frac{1}{x^2}-1\right)^{\frac{4}{3}}+c$ (c) $\frac{1}{8}\left(1-\frac{1}{x^2}\right)^{\frac{4}{3}}+1$ (d) None of these

318. $\int \frac{(x^4-x)^{1/4}}{x^5}dx$ is equal to

(a) $\frac{4}{15}\left(1-\frac{1}{x^3}\right)^{\frac{5}{4}}+c$ (b) $\frac{4}{5}\left(1-\frac{1}{x^3}\right)^{\frac{5}{4}}+c$ (c) $\frac{4}{15}\left(1+\frac{1}{x^3}\right)^{\frac{5}{4}}+c$ (d) None of these

319. If $\int \frac{1}{x\sqrt{1-x^3}}dx = a\log\left|\frac{\sqrt{1-x^2}-1}{\sqrt{1-x^2}+1}\right|+b$, then a is equal to

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $-\frac{1}{3}$ (d) $-\frac{2}{3}$

Advance Level

320. $\int \frac{1}{[(x-1)^3(x+2)^5]^{1/4}}dx$ is equal to

(a) $\frac{4}{3}\left(\frac{x-1}{x+2}\right)^{\frac{1}{4}}+c$ (b) $\frac{4}{3}\left(\frac{x+2}{x-1}\right)^{\frac{1}{4}}+c$ (c) $\frac{1}{3}\left(\frac{x-1}{x+2}\right)^{\frac{1}{4}}+c$ (d) $\frac{1}{3}\left(\frac{x+2}{x-1}\right)^{\frac{1}{4}}+c$

321. $\int \frac{1}{(1+x^2)\sqrt{1-x^2}}dx$ is equal to

(a) $\frac{1}{2}\tan^{-1}\left(\frac{\sqrt{2}x}{\sqrt{1-x^2}}\right)$ (b) $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\sqrt{2}x}{\sqrt{1+x^2}}\right)$ (c) $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\sqrt{2}x}{\sqrt{1-x^2}}\right)$ (d) None of these

322. Let $f(x)=\int \frac{x^2dx}{(1+x^2)(1+\sqrt{1+x^2})}$ and $f(0)=0$, then $f(1)$ is

(a) $\log(1+\sqrt{2})$ (b) $\log(1+\sqrt{2})-\frac{\pi}{4}$ (c) $\log(1+\sqrt{2})+\frac{\pi}{4}$ (d) None of these

323. Let $\int \frac{x^{1/2}}{\sqrt{1-x^3}}dx=\frac{2}{3}gof(x)+c$, then

(a) $f(x)=\sqrt{x}$ (b) $f(x)=x^{3/2}$ (c) $f(x)=x^{2/3}$ (d) $g(x)=\sin^{-1}x$

(e) Both b and d

324. $\int \frac{dx}{\sqrt{x+x\sqrt{x}}}$ is equal to

(a) $\log\sqrt{x+x\sqrt{x}}+c$ (b) $\sqrt{1+\sqrt{x}}+c$ (c) $4\sqrt{1+\sqrt{x}}+c$ (d) None of these

325. $\int \frac{x^4-1}{x^2\sqrt{x^4+x^2+1}}dx=$

(a) $\sqrt{x^2+\frac{1}{x^2}+1}$ (b) $\frac{\sqrt{x^4+x^2+1}}{x}$ (c) $\sqrt{\frac{x^4+x^2+1}{x}}$ (d) Both a and b

326. $\int \frac{dx}{(x+\alpha)^{8/7}(x-\beta)^{6/7}}=$

(a) $\frac{6}{\alpha+\beta}\left(\frac{x-\beta}{x+\alpha}\right)^{\frac{1}{6}}$ (b) $\frac{6}{\alpha+\beta}\left(\frac{x+\alpha}{x-\beta}\right)^{\frac{1}{6}}$ (c) $\frac{7}{\alpha+\beta}\left(\frac{x+\alpha}{x-\beta}\right)^{\frac{1}{7}}$ (d) $\frac{7}{\alpha+\beta}\left(\frac{x-\beta}{x+\alpha}\right)^{\frac{1}{7}}$

327. $\int \frac{xdx}{(x^2+1)^{4/5}(x^2+2)^{6/5}}=$

(a) $\frac{2}{5}\left(\frac{x^2+2}{x^2+1}\right)^{\frac{1}{5}}$ (b) $\frac{5}{2}\left(\frac{x^2+2}{x^2+1}\right)^{-\frac{1}{5}}$ (c) $\frac{5}{2}\left(\frac{x^2+1}{x^2+2}\right)^{\frac{1}{5}}$ (d) Both (b) and (c)

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Answer Sheet

Assignment (Basic and Advance Level)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
d	b	a	b	b	c	b	c	c	b	a	c	c	c	a	a	a	a	d	a
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
b	b	b	a	c	a	d	c	d	d	d	a	a	b	d	b	d	a	b	d
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
a	b	a	a	c	a	c	d	a	c	c	b	c	a	d	d	b	a	c	b
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
c	a	b	c	b	c	a	b	b,c	b	c	c	c	a	c	a	b	d	a	a
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
b	c	c	c	b	a	d	b	d	b	c	c	a	a	b	a	b	a	b	c
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
c	b	a	a	a	b	b	b	a	a	b	a	d	a	c	a	a	c	a	b
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
c	b	b	c	a	b	b	b	b	d	d	d	a	a	b	a	a	c	a	c
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
d	b	a	c	c	c	a	b	b	c	b	a	a	b	c	d	b	a	b	b
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
b	c	a	a	b	a	a	a	b	b	b	a	a	c	a	a	b	c	d	d
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
b	b	b	d	c	b	b	c	c	b	a	c	c	b	d	a	b	a	c	c
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
a	c	a	a	b	c	a	a	a	c	d	d	c	b	b	a	a	d	d	b
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
d	d	c	a	c	a	a	b	d	b,d	a	a	b	b	b	a	c	d	a	c
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
b	a	a	a	a	b	b	d	c	a	a	c	b	a	a	a	a	a	a	b
261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
b	b	a	c	c	b	d	d	a	a	a	a	a	b	a	d	c	b	a	c
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
a	d	b	c	b	b	d	b	a	b	c	a	d	a	a	c	b	a	b	b
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320
c	b	c	c	d	a	d	b	b	d	c	c	b	a	b	b	b	a	a	a
321	322	323	324	325	326	327													
c	b	e	c	d	d	d													